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THE NATIONAL POTATO-BREEDING PROGRAM, 1970

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PROCUREMENT SECTION
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(Forty-first Annual Report to Cooperators)
Plant Industry Station
Beltsville, Maryland

March 1971

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* sufficiently complete to justify general release. Such findings,
* when adequately confirmed, will be released promptly through
* established channels. Therefore, this report is not intended for
* publication and should not be referred to in literature citations.

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TABLE OF CONTENTS

Page

UNITED STATES DEPARTMENT OF AGRICULTURE:

Plant Industry Station, Beltsville, Md., and Chapman and Aroostook Farms, Presque Isle, Maine -----	1
By R. E. Webb, USDA, Beltsville, Md.; David Wilson, Presque Isle, Maine.	
Distribution -----	1
Chapman Farm -----	3
Aroostook Farm -----	5
Beltsville Farm -----	22

Potato Disease Investigations -----	24
By Robert Young, David Wilson and R. E. Webb	
Common Scab and Verticillium wilt Resistance -----	24
Early Blight -----	25
Late Blight -----	25
Virus Diseases-----	26
Resistance to Leafroll Virus and Net Necrosis-----	27

Interregional Potato Introduction Project-----	38
By R. W. Ross and P. R. Rowe, Wisc. Agr. Exp. Sta., Madison, Wisc.	

North Central Regional Trial -----	40
By R. H. Johansen, N. D. Agr. Exp. Sta., Fargo, N.D., and Cooperators	
Environmental Conditions-----	40
Cultural Practices -----	40
Entries -----	41
Yields -----	41
Maturity-----	42
Total Solids-----	42
Scab Reaction-----	42
Internal and External Defects -----	42
Overall Merit Ratings -----	42

ALABAMA -----	50
By J. L. Turner, and Hubert Harris, Ala. Agr. Exp. Sta., Auburn, Ala., Frank E. Garrett, Gulf Coast Substation, Fairhope, Ala., S. E. Gissendanner and John Eason, Sand Mountain Substation	

ALASKA -----	57
By Curtis H. Dearborne, Univ. of Alaska, Palmer, Alaska	

CALIFORNIA -----	58
By R. E. Voss and J. C. Bishop	

	<u>Page</u>
CANADA -----	61
By G. R. Johnston and R. G. Rowberry, Ontario Agr. College, Guelph	
Regional and Adaptation Trials-----	61
Culinary Ratings -----	64
Discussion of Potato Cultivars -----	72
COLORADO-----	75
By James A. Twomey, San Luis Valley Branch Sta., Center, Colo.	
Seedling Program -----	75
Yield Trial -----	75
DELAWARE -----	78
By E. P. Brasher, D. J. Fieldhouse and Myron Sasser, Del. Agr.	
Exp. Sta., Newark, Del.	
By R. F. Stevens, F. Webb and R. C. Ginder-----	79
ICELAND -----	80
By E. I. Siggeirsson, Reyhjavik, Iceland	
MAINE -----	82
By Hugh J. Murphy, Maine Sta., Michael J. Goven, Maine Sta.,	
Orono, Maine	
MICHIGAN -----	88
By N. R. Thompson, Univ. of Mich. Agr. Exp. Sta., East Lansing, Mich.	
Overstate Yield and Quality Trial -----	90
MINNESOTA-----	94
By F. I. Lauer, E. B. Radcliffe, O. C. Turnquist, and C. J. Eide,	
Minn. Agr. Exp. Sta., St. Paul, Minn.	
Variety Demonstrations -----	94
Spacing Trial -----	94
Aphid Resistance -----	106
NEW JERSEY -----	115
By John C. Campbell, N. J. Agr. Exp. Sta., New Brunswick, N. J.	
Rutgers' Farm -----	115
George Coombs' Farm -----	115
George Rue Farm -----	116
By C. E. Cunningham, R. L. Nickeson, and T. E. Snyder, Campbell	
Institute for Agricultural Research -----	120

	<u>Page</u>
NEW YORK -----	130
By S. Dallyn, P. Schippers and D. Fricke, Long Island Veg. Res. Farm, Riverhead, N. Y.	
Variety Trials -----	130
By R. C. Cetas, Cornell Agr. Exp. Sta., Ithaca, N. Y.	
Verticillium Wilt -----	136
Methods and Materials -----	136
Results -----	137
Results of Chipping Tests -----	147
By R. L. Plaisted, L. C. Peterson, and H. D. Thurston, Cornell Agr. Exp. Sta., Ithaca, N. Y. -----	149
By J. B. Sieczka and E. E. Ewing, Cornell Agr. Exp. Sta., Ithaca, N. Y. -----	163
NORTH CAROLINA -----	171
By F. L. Haynes, North Carolina Agr. Exp. Sta., Raleigh, N. C.	
NORTH DAKOTA -----	178
By R. H. Johansen and J. E. Huguelet, N. D. Agr. Exp. Sta., Fargo, N. D.	
Potato Crossing Program -----	178
Greenhouse and Field Seedlings -----	178
Advanced Selections -----	178
Processing Trials -----	178
Culinary Tests -----	180
Promising Selections -----	180
Variety Trials -----	180
Disease Testing -----	182
OHIO -----	191
By Floyd Lower, Ohio Agr. Exp. Sta., Wooster, Ohio	
How the Work was Done and Seasonal Conditions -----	191
Yields and Essential Data -----	191
PENNSYLVANIA -----	196
By C. S. Bryner, Pa. Agr. Exp. Sta., Univ. Park, Pa.	
Cultural Information and Rainfall -----	196
Specific Gravity and Dry Matter -----	196
By J. D. Harrington, F. Poust, M. R. Henninger, R. B. Beelman and R. A. Miller -----	200

	<u>Page</u>
SOUTH CAROLINA -----	208
By W. R. Sitterly, Agr. Exp. Sta., Clemson, S. C.	
TENNESSEE -----	210
By C. A. Mullins, H. D. Swingle, and I. E. McCarty, Tennessee Agr. Exp. Sta., Knoxville, Tenn.	
TEXAS -----	212
By B. A. Perry, M. C. Fuqua, W. N. Lipe, S. D. Cotner, Texas Agr. Exp. Sta., College Sta., Texas, R. E. Webb, USDA, Beltsville, Md. Screening and Evaluation of Varieties and Seedlings -----	212
By R. D. Peel, S. B. Norrell, Paris, Texas, C. E. Cunningham and R. L. Nickeson, Riverton, N. J. Cooperative Testing of Potato Varieties for Use in Soups -----	215
VERMONT -----	221
By Samuel C. Wiggins, Wilfred R. Kelly, Richard Jensen, Kenneth Atwood, Montpelier, Vt., and Hugh Murphy, Univ. of Maine, Orono, Maine	
WASHINGTON -----	225
By William G. Hoyman, Irrigation Exp. Sta., Prosser, Washington Distribution -----	225
Early and Late Harvest Trials -----	225
Selections -----	226
By N. Holstad, R. Kunkel, and R. C. Holland, Agr. Exp. Sta., Pullman, Washington Variety Trials -----	230
WISCONSIN -----	234
By P. R. Rowe and R. W. Ruhde, Wisc. Agr. Exp. Sta., Madison, Wisc. Genetics and Cytogenetics of Tuber-Bearing <u>Solanum</u> Species -----	234
WYOMING -----	236
By K. E. Bohnenblust, Agr. Exp. Sta., Laramie, Wyoming	

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This publication reports research involving pesticides. It does not contain recommendations for their use, nor does it imply that the uses discussed here have been registered. All uses of pesticides must be registered by appropriate State and/or Federal agencies before they can be recommended.

CAUTION: Pesticides can be injurious to humans, domestic animals, desirable plants, and fish or other wildlife--if they are not handled or applied properly. Use all pesticides selectively and carefully. Follow recommended practices for the disposal of surplus pesticides and pesticide containers.

PLANT INDUSTRY STATION (Beltsville, Md.) and
CHAPMAN AND AROOSTOOK FARMS (Presque Isle, Maine)
R. E. Webb and David Wilson

Distribution

Summaries of seed, seedling tubers, clonal lines, and named varieties shipped to foreign countries and cooperating states and industry are given in tables 1, 2, and 3. One hundred and forty-one lots of named varieties, 173 advanced selections, 5669 seedling tubers and over 16,000 true seed were sent to interested parties in 19 foreign countries (table 1). One hundred and twenty-five lots of named varieties and 1043 lots of advanced selections were sent to 34 cooperators in 22 states (table 2). Five hundred and five progenies comprising 70,810 seedling tubers and just over 10,000 true seed were distributed to 5 cooperators in the United States (table 3).

P.I. table 1. Distribution of potato varieties, advanced selections, seedling tubers and true seed to foreign countries, 1970.

Country	Cooperator	Number of			
		Varie- ties	Selec- tions	Seedling tubers	True seed
Argentina	Cesar Induni	10	8		
Bulgaria	P. Vulchev	8			
Canada	D. Young		8		
Costa Rica	M. Seligson	3	11		
	R. Bianchini	3	7		
	Carlos A. Gonzalez	8			
El Salvador	Julio Cruz	2	34		
Finland	R. Manner	6			
Ghana	USAID	30			
India	Hari Kishore		50		
Iran	M. MacKarechian	12			
Ireland	P. Comar	1			
Korea	L. A. Gattoni (USAID)	1	9		
	Kim, Kang-kwun		2		
Nigeria	D. Suchomel			5669	
Puerto Rico	F. Abruna	3	7		
Spain	P. de la Hera	22	7		
Tonga	Liahona High School	10			
Tunisia	H. Johnson (USAID)	10			
Turkey	S. C. Litzenberger (USAID)	10			
Uganda	R. T. Wurster				16,650
Venezuela	Jose A. Gonzalez	2	30		
TOTALS		141	173	5669	16,650

P.I. table 2. Distribution of varieties, and advanced selections to States, 1970.

State	Cooperator	Varieties	Selections
Alabama	J. L. Turner	6	
Alaska	C. H. Dearborn	10	181
Arizona	N. E. Oebker	12	
Colorado	C. Livingston		1
Delaware	G. Brasher	3	21
Florida	J. P. Shumaker	11	19
Idaho	D. Douglas	2	6
Maine	R. Akeley		3
	C. E. Cunningham		481
Maryland	S. L. Sinden	5	
	L. Sanford	2	78
	R. Goth		5
	G. McCollum	3	
	J. Kantzes	6	
Minnesota	C. Eide		1
	O. Turnquist	1	
Mississippi	W. R. Hawthorne	5	24
Montana	H. N. Metcalf	1	
New Jersey	J. Campbell	8	22
New York	D. Fricke	2	10
	J. Sieczka	7	4
	R. Cetas	5	21
North Dakota	R. Johansen		3
Ohio	L. Sanford		
	J. P. Sleesman	1	15
	F. Lower	6	
Pennsylvania	J. D. Harrington	2	10
	E. Hoover		57
Rhode Island	F. L. Howard	6	1
	R. S. Bell	2	10
South Carolina	W. R. Sitterly	4	4
Texas	B. Perry	5	36
Virginia	B. Graves	10	20
Washington	W. G. Hoyman		10
TOTALS		125	1043

P.I. table 3. Distribution of first-year seedling tubers and true seed in the U.S. from Beltsville, 1970.

State	Cooperator	Progenies	Seedlings	Seed
		No.	No.	No.
Colorado	James A. Twomey	166	15,960	
Maine	David Wilson	261	48,123	
North Carolina	Frank Haynes	42	6,006	
		25		10,025
Wisconsin	Roger Rowe	11	721	
	TOTALS	505	70,810	10,025

Chapman Farm

Approximately 46,000 seedlings representing 261 parental combinations from Beltsville were planted on Chapman Farm. From these about 1500 selections were made for observation in 12-hill lots in 1970.

A summary of the maturity and fertility of 1470 selections grown in 12-hill lots during the 1970 growing season is given in PI table 4. Cobbler (early), Chippewa (medium), and Green Mountain (late) planted at the same time at another location served as controls for maturity determinations.

P.I. table 4. Maturity and fertility of seedlings grown in 12-hill rows in 1969.

Maturity Classes	Seedling		Fertility Classes	Seedling	
	No.	Pct.		No.	Pct.
Early	244	16.7	None	627	42.7
Medium	623	41.7	Slight	169	11.5
Late	603	41.4	Good	674	43.8
TOTAL	1470			1470	

From the 1470 12-hill selections, 340 were selected to be grown in the 60-hill increase plots for an evaluation of yield, tuber characteristics, specific gravity and processing qualities in 1971.

One hundred and ninety-two selections were grown in the 60-hill increase plots and evaluated for vine type, maturity, fertility, tuber conformation, specific gravity, processing quality (chips and french fries) and yield. In part, because of excessive moisture during harvest specific gravity and processing quality were generally low. One hundred and twenty-two entries were selected for preliminary yield trials in 1971 and further evaluations on chip and french fry qualities.

Golden Nematode (biotype A) Resistance. Twenty-nine selections from the 12-hill series were collected by Dr. L. C. Peterson, Cornell University and screened by associates for reaction to the golden nematode. Eighteen selections proved resistant. Table 5 lists the resistant selections, parentage, specific gravity, maturity and chip and french fry quality.

P.I. table 5. Golden nematode resistance.

Pedigree	Parentage	Specific Gravity	Maturity	Chip ^{1/}	French Fry ^{1/}
B6968-3	DT5997-IR x B5281-1	1.068	E	8.8	3.7
B6974-1	B4523-8 x B5755-8	1.068	L	8.5	4.0
B6974-2	B4523-8 x B5755-8	1.061	M	10.0	4.5
B6974-10	B4523-8 x B5755-8	1.061	L	9.5	4.0
B6974-11	B4523-8 x B5755-8	1.062	L	10.0	4.0
B6974-12	B4523-8 x B5755-8	1.065	L	9.5	4.0
B6974-14	B4523-8 x B5755-8	1.070	L	9.0	3.5
B6986-2	Wauseon x B4469-7	1.085	L	6.8	1.5
B6987-2	Wauseon x B5141-6	1.079	L	8.5	3.0
B6987-18	Wauseon x B5141-6	1.069	L	6.7	3.0
B6987-22	Wauseon x B5141-6	1.085	ML	7.5	2.5
B6987-25	Wauseon x B5141-6	1.085	L	7.0	2.1
B6987-29	Wauseon x B5141-6	1.087	L	7.5	2.5
B6987-43	Wauseon x B5141-6	1.082	L	5.5	2.0
B6987-56	Wauseon x B5141-6	1.085	M	6.8	2.5
B7003-1	B5281-1 x B5011-17	1.072	M	9.5	3.9
B7003-6	B5281-1 x B5011-17	1.072	L	10.0	5.0
B7005-1	B5281-1 x B5755-8	1.074	L	9.8	4.5

^{1/} See footnotes table 6.

Aroostook Farm

The experimental design for all yield tests conducted on Aroostook Farm during 1970, was a randomized complete block with four replications. All plots received 800 pounds on 15-15-15 fertilizer banded in 36-inch rows by a two-row planter. The seedlings to be tested were hand planted in 25-hill rows with 9-inch spacing. During the growing season cultural methods for weed, insect and disease control were conducted according to local recommendations. Growing season was dry. The harvest season was wet. Most of the seedlings evaluated in these yield tests were screened for resistance to five different viruses, scab, Verticillium wilt, early and late blight, and ring rot during the 1970, growing season. At harvest all entries were graded and samples hand selected for specific gravity and quality evaluations. Specific gravity was determined by the air and water method. After gravities were recorded the samples were divided and placed in 50°F and 40°F storage at 90% Relative Humidity.

Samples were fried after four months of storage. One set of samples was reconditioned at 70°F for two weeks after four months at 40°F. Potato chips were made from each sample by cutting the tubers in half and taking a 1/16-inch thick slice from each tuber with a rotary food slicer. The tuber slices were rinsed in water and placed on paper towels to remove excess water. Chips were then fried at 350°F in Primex vegetable shortening until bubbling ceased.

A french fry plug 3/8-inch in diameter was cut from each half of the tubers in the sample. After plugs were trimmed, rinsed and excess water removed, they were fried at 375°F in Primex shortening for five minutes.

Each potato chip and french fry was classified after frying into color classes. Chip classes ranged from 1-very light to 10-very dark. French fry classes ranged from 1-very light to 5-very dark. Weighed averages were calculated by multiplying the number of chips or fries in each color class by the number of the color class, totaled and divided by the number of chips or fries in each sample. Color ratings were made using the PCII reference color chart 1206-U.

Advanced Seedling Trials

Early Maturity Yield Test. Nine numbered seedlings and the varieties Norgold Russet and Irish Cobbler (table 6) were planted on May 22. After a growing season of 100 days plots were quick-killed on August 28 and harvested on September 8. Six seedlings significantly outyielded both Irish Cobbler and Norgold Russet with four seedlings (B6448-7, B6529-12, B6573-11, and B6599-1) producing in excess of 300 cwt/acre. One seedling (B6535-10) yielded less than Norgold Russet and Irish Cobbler.

Eight of the seedlings tested ranged from 91-98 percent of yield above 2-inches. B6535-10 exhibited a size problem at 9-inch spacing producing only 75 percent U.S. No. 1.

The specific gravity of most entries was relatively good. One seedling, B6558-16, had the highest specific gravity (1.082) and was in the same range as Irish Cobbler. Five seedlings were significantly lower in specific gravity than Norgold Russet.

Chips made from Irish Cobbler after four months of constant 50°F storage were rated 8.0. Three seedlings were rated lower than Irish Cobbler with one B6529-12, producing acceptable chips. None of the entries chipped from 40°F constant storage or from reconditioning produced commercially acceptable potato chips.

French fry samples taken from constant 50°F storage were rated for color and texture. One seedling, B6535-10, produced acceptable fries as determined by color but texture was unacceptable. None of the entries produced acceptable french fry color when cooked from constant 40°F or from reconditioning storage.

P.I. table 6. Early Maturity Yield Test, Arcostock Farm, Presque Isle, Maine 1970

Seedlings Tested	Yield Per Acre over 2-inches	Specific Gravity	Chip Rating <u>2/</u>		Fry Rating <u>3/</u>		Fry <u>4/</u> Tex.
			40°F * 50°F	40-70°F	40°F * 50°F	40-70°F	
	CWT	PCT					
BR6448-7	315	94.6	10.0	8.5	5.0	3.8	I
B6529-12	309	95.8	10.0	6.9	3.8	3.1	I
B6536-10	227	74.5	8.4	7.5	3.8	3.0	S
B6547-7	297	97.8	9.5	9.5	5.0	4.2	I
B6558-16	294	92.0	9.3	7.7	4.0	3.1	M
B6573-11	328	91.7	10.0	9.8	5.0	4.0	I
B6597-20	280	95.1	10.0	8.1	4.5	3.6	I
B6599-1	322	93.9	10.0	8.3	4.4	3.6	I
BR6617-2	272	92.5	9.8	8.6	5.0	3.7	I
Nor. Russ.	248	80.6	10.0	8.5	4.5	4.3	I
I. Cobbler	244	81.4	9.5	8.0	3.8	3.3	M
LSD 5%	39		0.5	1.2	0.5	0.5	0.6

1/ 1.0 omitted from all ratings

2/ After four months of storage at 40°, 50°, and reconditioning 40-70°F for two weeks;
1-light; to 10-very dark; 7.0 or less acceptable

3/ After four months of storage at 40°, 50°, and reconditioning 40-70°F for two weeks;
1-light to 5-very dark; 3 or less acceptable

4/ I-intermediate S-soggy M-mealy; I-M acceptable

* Mean of two replications

Medium Maturity Yield Trial. Nineteen numbered seedlings and two check varieties, Alamo and Chippewa, were planted in the advanced medium maturity yield test (table 7). All entries were planted on May 25 and quick-killed on September 8, allowing a growing season of 110 days. Plots were harvested on September 16, 1970. One seedling, B6587-11 was planted at two seed spacings, 9 and 12 inches, respectively.

One seedling, B6534-2, produced significantly higher yields than Alamo. Five seedlings produced significantly higher yields than Chippewa. Five seedlings produced yields significantly lower than the check variety Alamo. B6591-7 produced less than 90 percent primes. All other entries ranged from 90-97 percent yield above 2-inches.

Specific gravities for Alamo and Chippewa were 1.071 and 1.070 respectively. Eight seedlings were significantly higher in specific gravity than Chippewa. Two seedlings B6545-7 and BR6315-4 were significantly lower in specific gravity than Chippewa.

Chip color of all entries was commercially unacceptable following the three storage treatments. Five seedlings produced equal or lighter color chips than the check Chippewa from 50°F storage but none were acceptable.

All entries were screened for french fry color and texture after three storage treatments. One seedling, B6562-14, produced acceptable french fries after 2 weeks of reconditioning at 70°F.

P.I. table 7. Medium Maturity Yield Test. Aroostook Farm, Presque Isle, Maine. 1970 ^{1/}

Seedlings Tested	Yield Per Acre over 2 inches	Specific Gravity	Chip Rating			Fry Rating		Fry Tex.	
			40°F	50°F	40-70°F	40°F	50°F		40-70°F
	CWT	PCT							
BR6263-2	321	90	10.0	9.2	9.7	5.0	3.7	4.3	S
BR6265-8	357	96	10.0	9.3	9.3	5.0	4.0	4.0	I
BR6273-1	356	97	9.2	7.7	8.1	3.9	3.4	3.3	M
BR6315-4	352	91	10.0	10.0	10.0	5.0	4.8	5.0	I
B6376-6	348	95	10.0	8.3	9.2	4.0	4.0	3.9	M
BR6456-1	344	93	9.5	9.3	9.5	4.3	4.4	4.1	I
B6534-2	407	96	10.0	9.5	10.0	5.0	4.8	5.0	S
B6545-7	317	91	10.0	9.8	10.0	5.0	4.0	5.0	I
B6545-20	391	93	10.0	9.0	10.0	5.0	4.1	4.2	S
B6548-1	312	96	10.0	10.0	10.0	5.0	5.0	5.0	I
B6568-2	281	95	10.0	9.3	10.0	5.0	4.6	5.0	I
B6562-14	373	95	8.5	7.9	7.9	4.0	3.6	3.0	M
B6562-22	382	97	9.7	9.0	9.4	5.0	4.0	4.1	I
B6565-2	395	93	10.0	9.8	10.0	5.0	5.0	5.0	I
B6573-25	351	96	10.0	9.8	10.0	5.0	3.9	4.8	I
B6581-17	356	93	8.8	8.9	9.5	4.0	3.7	4.2	I
B6587-11	306	90	9.0	8.6	8.6	3.9	3.8	4.2	I
B6587-11 (9")	333	93	9.2	8.3	8.9	4.0	3.2	4.3	I
B6587-11 (12")	299	88	10.0	9.8	10.0	4.5	4.5	4.3	I
B6591-7	312	96	8.0	7.3	8.3	3.5	3.3	3.4	I
BR6609-7	360	91	10.0	9.4	10.0	5.0	4.6	4.5	I
Alamo	317	91	9.5	8.3	9.8	5.0	3.9	4.0	I
Chippewa									
LSD 5%	44	06	0.5	0.8	0.6	0.3	0.8	0.5	

^{1/} See footnotes at end of table 6.

Late Maturity Yield Test. Twenty-three numbered seedlings and three varieties Katahdin, Kennebec, and Wauseon were planted in the late maturity yield test (table 8). All entries were hand planted on May 25 and quick-killed on September 17, allowing a growing season of 115 days. Plots were harvested on October 7, 1970.

Six of the seedlings tested produced yields significantly higher than Katahdin. Two seedlings were significantly lower in yield than the check Katahdin. Twelve seedlings were in the same yield category as Kennebec. B6587-8 was the only seedling producing less than 90 percent U.S. number 1 tubers.

The specific gravity of Katahdin and Kennebec were 1.077 and 1.081 respectively. Eleven seedlings had specific gravities significantly higher than Katahdin. Five of these were higher than Kennebec. Two seedlings were lower in specific gravity than Katahdin. Seedling B5141-6 had the highest specific gravity in the test. B6518-8 had the highest specific gravity of the other seedlings.

The color of chips made from samples taken after four months of storage at 50°F ranged from 7.1 to 10.0. None of the entries produced acceptable chips. Four of the seedlings produced chips in the same range as seedling B5141-6. After four months of storage at 40°F followed by a two-week period of reconditioning at 70°F, two entries produced acceptable chips. None of the entries would chip direct from 40°F storage.

After four months of 50°F storage three entries produced acceptable french fries. Six entries were in the same range as B5141-6 which produced the best fry color. After four months of 40°F storage followed by a two-week reconditioning period at 70°F three entries produced acceptable fries. Four entries were in the same range as B5141-6. After four months of 40°F storage, two entries, B5141-6 and BR6293-12, produced acceptable french fries.

P.I. table 8. Late Maturity Yield Test. Aroostook Farm, Presque Isle, Maine. 1970 ^{1/}

Seedlings Tested	Yield Per Acre Over 2 inches	Specific Gravity	Chip Rating		Fry Rating		Fry Tex.
			40°F	50°F	40°F	50°F	
	CWT	PCT					
BR6290-3	362	95	9.5	8.6	4.2	3.7	I
BR6293-12	355	94	8.4	7.3	3.0	2.5	M
BR6312-2	231	97	10.0	10.0	5.0	5.0	S
BR6446-2	369	95	10.0	10.0	5.0	4.6	I
BR6463-2	344	95	10.0	9.4	4.5	3.9	I
B6516-19	283	92	8.9	7.2	4.1	2.9	M
B6516-27	408	93	9.0	7.9	4.1	3.1	I
B6518-4	432	94	10.0	9.1	5.0	3.9	I
B6518-8	394	93	10.0	9.3	4.0	3.5	M
B6519-5	333	95	9.8	8.8	4.0	4.1	I
B6519-6	425	96	10.0	10.0	5.0	5.0	I
B6527-33	394	94	8.5	7.5	4.3	3.8	I
B6537-4	391	97	10.0	9.8	5.0	4.8	I
B6567-12	447	96	10.0	10.0	5.0	4.5	I
B6581-4	386	94	9.2	8.8	4.0	3.6	I
B6581-15	377	92	8.7	7.4	3.9	3.2	I
B6587-8	314	83	10.0	9.9	5.0	4.5	I
B6595-5	366	94	8.7	8.3	4.0	3.2	I
B6596-1	396	97	10.0	9.3	5.0	4.0	I
B6603-6	355	96	8.5	8.3	4.0	3.3	M
BR6614-1	407	97	9.2	8.6	4.2	3.2	I
BR6626-5	403	96	10.0	9.9	5.0	4.1	I
Katahdin	359	94	10.0	8.3	5.0	3.8	I
Kennebec	418	96	8.7	8.0	4.5	3.0	I
Wauseon	386	95	10.0	8.5	5.0	3.5	I
B5141-6	372	92	7.7	7.1	3.0	2.5	M
LSD 5%	48		.6	.7	.2	.7	

^{1/} See footnotes at end of table 6.

New Seedling Trials

Early Maturity Yield Test. Six numbered seedlings and the varieties Norgold Russet and Irish Cobbler (table 9) were planted on May 22.

After a growing season of 100 days, plots were quick-killed on August 28 and harvested September 8, 1970. The LSD at the 5% level for yield in this test was 38 cwt/acre. One seedling, B6532-4, significantly out yielded Irish Cobbler. Three seedlings significantly out yielded Norgold Russet. One seedling, B6708-1, yielded less than Irish Cobbler but the difference was not significant.

Three of the seedlings tested produced 92-93 percent primes. B6708-1 exhibited a size problem producing only 76 percent primes. The seedlings tested ranged from 76 to 93 percent U.S. number one tubers.

The specific gravity of most seedlings tested was high. Irish Cobbler had a specific gravity reading of 1.078. Two seedlings, B6708-1 and B6516-5, had specific gravity readings of 1.085, the highest in the test. Two seedlings had specific gravity readings significantly lower than the check Norgold Russet.

Potato chips were made from all entries after four months of storage at 50°F. Irish Cobbler produced chips with a color rating of 7.5. B6516-5 produced chips with a color rating of 5.8 and was the only entry producing acceptable potato chips.

P.I. table 9. Early Yield Test. Aroostook Farm. 1970.^{1/}

Seedling Tested	Yield Per Acre over 2 inches		Specific Gravity	Chip Color	Fry Color	Fry Tex.
	CWT	PCT				
B6692-5	274	93	75	9.3	4.4	I
B6708-1	223	76	85	7.8	3.4	I
B6731-2	262	86	69	7.2	3.0	S
B6764-2	242	84	67	10.0	5.0	S
B6516-5	240	92	85	5.8	2.5	I
B6532-4	315	93	81	7.8	3.1	M
Nor. Russ.	220	82	76	9.2	4.8	I
I. Cobbler	238	84	78	7.5	3.4	M
LSD 5%	38		04	0.8	0.6	

^{1/} See footnotes at end of table 6.

All entries were rated for french fry color and texture after four months of 50°F storage. Irish Cobbler produced fries with a 3.4 color rating. B6516-5 produced acceptable fries after this storage treatment. B6731-2 produced fries of acceptable color but the texture was poor.

Medium Maturity Yield Test. Twenty-seven numbered seedlings and the varieties Alamo and Chippewa (table 10) were planted on May 25. Tops were quick-killed on September 8 allowing a growing season of about 110 days. Plots were harvested on September 16, 1970.

One seedling, B6799-5, produced yields significantly higher than Alamo. Five seedlings produced significantly lower yields than Chippewa. Seven seedlings produced yields within the same range as the check Alamo.

Twenty-four seedlings produced 90-97 percent prime tubers. B6532-10 and B6731-3 produced 80 and 83 percent prime tubers respectively.

B6516-26, B6532-3, and B6532-10 had specific gravity readings ranging from 1.091 to 1.093. Four seedlings had readings above 1.080. Thirteen seedlings had significantly higher readings than the check varieties. Five seedlings had specific gravity readings significantly lower than the check varieties.

Entries were evaluated for potato chip color following four months of storage at 50°F. One seedling, B6516-15, produced acceptable potato chips.

All seedlings were evaluated for french fry color and texture after four months of 50°F storage. One seedling, B6516-15, produced acceptable french fries.

P.I. table 10. Medium Yield Test. Arrostook Farm 1970. ^{1/}

Seedling Tested	Yield Per Acre over 2 inches		Specific Gravity	Chip Color	Fry Color		Fry Tex.
	CWT	PCT			50°F	50°F	
B6679-6	328	94	77	9.3	4.5	S	
B6682-2	272	90	74	8.3	4.2	M	
B6692-19	259	94	79	9.8	5.0	S	
B6703-2	208	91	70	9.1	3.8	I	
B6705-10	370	97	75	8.4	4.3	S	
B6712-17	347	95	83	7.5	3.8	M	
B6712-26	339	97	71	8.9	4.7	I	
B6731-3	295	83	72	8.5	4.5	I	
B6739-2	309	93	82	8.7	4.9	I	
B6741-3	295	94	75	8.0	3.8	S	
B6743-3	417	94	68	9.5	4.8	S	
B6761-1	380	95	62	9.3	4.8	I	
B6774-6	344	93	77	9.3	5.0	I	
B6782-1	412	94	67	9.8	4.8	S	
B6799-1	297	88	67	9.2	4.8	I	
B6799-5	457	96	62	8.5	3.9	S	
B6878-2	334	95	81	10.0	5.0	M	
B6887-1	346	95	66	8.8	4.5	I	
B6887-5	411	96	62	9.2	4.0	I	
B6887-12	415	97	64	9.5	4.8	S	
B6887-16	414	96	65	9.3	4.5	S	
B6516-15	318	97	78	6.8	3.0	M	
B6516-26	328	95	91	7.1	3.3	M	
B6518-10	305	94	81	8.7	4.4	M	
B6532-3	335	90	91	8.5	4.0	M	
B6532-10	239	80	93	8.5	4.2	M	
B6548-3	268	96	71	10.0	5.0	I	
Alamo	384	94	70	9.3	4.3	I	
Chippewa	320	89	70	8.6	4.1	I	
LSD 5%	36		04	0.8	0.8		

^{1/} See footnotes at end of table 6.

Late Maturity Yield Test. Thirty-three numbered seedlings and three check varieties were planted on May 25 and quick-killed on September 17, allowing a growing season of 115 days (table 11). Plots were harvested on October 7, 1970.

Due to heavy rains and plot location high significance was found between replications in the yield data. This was due to wet rot loss prior to harvest. Yield data by replication is given in table 12.

Twenty-five seedlings produced 90 to 97 percent prime tubers. B6751-3 produced only 81 percent prime tubers at nine-inch spacing.

The range of the specific gravities for entries and varieties in the trial was from 1.064 to 1.100. Specific gravity of Kennebec and Katahdin was 1.086. B6495-20 had a specific gravity reading of 1.098. Eight seedlings were in the same specific gravity range as Kennebec. Twenty-three seedlings had specific gravities significantly lower than the checks Kennebec and Katahdin.

All entries were evaluated for chip color after four months of 50°F storage. Only two seedlings, B6516-18 and B6516-28, made acceptable potato chips.

All entries were evaluated for french fry color and texture. Six seedlings, B6692-9, B6712-18, B6741-11, B6495-20, B6516-18, and B6516-28, produced acceptable french fries.

P.I. table 11. Late Yield Test. Aroostook Farm 1970. ^{1/}

Seedling Tested	Yield per acre over 2 inches		Specific Gravity	Chip Color	Fry Color	Fry Tex.
	CWT*	PCT				
B6692-1	371	95	85	8.7	3.8	I
B6692-9	296	95	84	7.9	2.5	M
B6692-22	331	93	74	10.0	4.8	I
B6692-27	370	91	82	9.3	3.8	M
B6698-19	361	95	86	8.1	3.1	I
B6712-9	293	93	79	8.8	3.5	I
B6712-18	270	94	87	8.3	2.8	M
B6718-4	221	90	71	9.5	4.3	I
B6718-8	339	95	69	9.8	4.5	I
B6727-5	415	97	70	9.9	4.0	S
B6741-11	328	92	76	7.3	2.8	I
B6741-22	352	92	72	9.4	3.8	S
B6741-23	265	88	70	10.0	4.0	S
B6747-5	388	96	73	10.0	4.5	I
B6750-3	369	93	64	10.0	5.0	I
B6750-7	323	91	79	10.0	4.5	I
B6751-3	357	81	67	10.0	4.8	I
B6761-9	289	86	72	9.5	4.5	I
B6761-11	369	88	69	8.8	3.3	I
B6761-12	315	88	72	8.7	3.3	I
B6772-5	267	85	66	9.0	3.3	I
B6775-4	309	93	74	10.0	5.0	S
B6814-16	325	94	72	9.3	3.4	I
B6815-14	388	96	70	9.5	4.5	I
B6815-19	430	97	76	8.4	3.2	I
B6879-5	358	94	76	10.0	4.5	I
B6879-11	350	87	73	9.8	4.4	I
B6887-6	406	95	71	10.0	4.9	S
B6495-12	347	90	89	9.3	3.9	M
B6495-20	362	92	98	8.1	3.0	M
B6516-18	314	94	91	6.3	2.0	I
B6516-28	280	94	89	6.6	2.0	M
B5141-6	274	88	100	7.4	2.3	M
Katahdin	306	91	86	9.2	4.1	I
Kennebec	295	93	86	7.8	2.8	I
Wauseon	397	95	80	9.1	3.6	I
LSD 5%	100		06	0.7	0.7	

^{1/} See footnotes at end of table 6

* See table 12

P.I. table 12. Late yield test. Yields by replication of U.S. No. 1 tubers showing variation due to loss from wet rots.

Seedling Tested	Rep 1	Rep 2	Rep 3	Rep 4	Mean cwt/ac
B6692-1	309	381	402	392	371
B6692-9	183	376	318	306	296
B6692-22	329	265	353	378	331
B6692-27	302	400	436	342	370
B6698-19	188	462	405	388	361
B6712-9	258	381	373	162	293
B6712-18	259	222	277	319	270
B6718-4	202	170	213	297	221
B6718-8	304	426	246	380	339
B6727-5	399	440	436	385	415
B6741-11	263	371	359	318	328
B6741-22	341	436	327	306	352
B6741-23	171	425	147	319	265
B6747-5	423	439	327	362	388
B6750-3	365	384	420	308	369
B6750-7	225	397	367	303	323
B6751-3	397	373	322	337	357
B6761-9	353	414	121	269	289
B6761-11	355	435	352	336	369
B6761-12	327	390	248	297	315
B6772-5	258	292	245	272	267
B6775-4	348	188	338	361	309
B6814-16	361	333	315	293	325
B6815-14	240	497	410	404	388
B6815-19	425	451	487	359	430
B6879-5	459	236	431	306	358
B6879-11	237	381	383	401	350
B6887-6	502	241	439	442	406
B6495-12	329	341	357	361	347
B6495-20	359	373	394	321	362
B6516-18	327	336	264	327	314
B6516-28	304	266	275	276	280
B5141-6	286	203	308	300	274
Katahdin	378	367	348	133	306
Kennebec	231	469	313	168	295
Wauseon	368	407	383	429	397

Golden Nematode Resistant Seedling Yield Trial. Twenty-two seedlings and two varieties, Wauseon and Peconic, with resistance to golden nematode (table 13) were planted on May 22. Tops were quick-killed on September 17 and tubers were harvested on October 7, 1970.

Four seedlings yielded more than Wauseon but none were significantly higher. These four seedlings significantly out yielded Peconic. Two seedlings, B6595-12 and B6731-3, had yields significantly lower than both check varieties.

Thirteen seedlings had between 91 and 97 percent prime tubers. Seven seedlings ranged from 82 to 89 percent prime tubers. Two entries produced below 80 percent U.S. No. 1 tubers.

Specific gravity readings ranged from 1.063 to 1.104. Three entries had significantly higher specific gravity readings than the check Wauseon. Seventeen of the entries were, significantly lower than the check variety Wauseon. B6595-12 had a specific gravity of 1.104, the highest in the trial.

Entries were evaluated for chip color after four months of storage at 50°F. Two seedlings, B6595-12 and B6741-11 produced chips with acceptable color ratings.

All entries were rated for french fry color and texture. Three entries, BR6316-5, B6595-12, and B6741-11, produced acceptable fries. The check variety Peconic made fries with a color rating of 2.9.

P.I. table 13. Golden Nematode Yield trial. ^{1/}Arroostook State Farm,
Presque Isle, Maine. 1970. ^{1/}

Seedling Tested	Yield Per Acre over 2 inches		Specific Gravity	Chip	Fry	Fry Tex.
	CWT	PCT		Color	Color	
				50°F	50°F	
BR6316-4	392	97	82	8.0	3.7	I
BR6316-5	385	96	85	7.4	2.8	I
BR6316-7	405	93	90	8.6	3.3	I
B6545-7	401	92	71	9.5	4.3	I
B6595-12	214	79	104	5.0	2.0	M
B6731-3	273	75	76	7.5	3.2	I
B6741-2	295	88	74	8.4	3.4	I
B6741-3	322	91	76	8.5	3.4	S
B6741-11	328	93	75	6.4	2.6	I
B6741-16	446	94	68	9.8	5.0	I
B6741-22	365	91	69	8.8	3.8	S
B6741-23	421	93	70	9.8	4.6	S
B6743-3	362	92	67	9.0	3.9	I
B6750-3	369	91	63	10.0	5.0	I
B6750-11	388	83	72	10.0	5.0	I
B6751-3	365	84	72	9.8	4.8	I
B6751-13	429	89	72	9.7	4.5	I
B6797-2	323	86	79	8.9	4.7	I
B6799-1	310	82	71	9.0	4.6	I
B6879-5	406	93	76	9.3	4.2	I
B6879-11	342	84	70	9.2	4.3	S
B6887-6	468	95	64	9.8	4.4	S
Wauseon	420	94	80	8.3	3.7	I
Peconic	363	88	85	7.0	2.9	I
LSD 5%	54		03	0.8	0.8	

^{1/} See footnotes at end of table 6.

Chip and Fry Yield Trial. Eighteen advanced seedlings and Kennebec, were planted on May 25 (table 14). Tops were quick-killed on September 17 and tubers were harvested on October 7, 1970.

Kennebec and B5141-6 yielded 418 and 372 cwt/acre of prime tubers respectively. Two seedlings, B6495-20, and B6532-4, were in the same yield range as Kennebec. All other entries produced significantly lower yields than Kennebec. Six seedlings were in the same yield range as B5141-6. All other entries were significantly lower in yield.

Percentage of prime tubers ranged from 78 to 96 percent. B6595-12 produced 78 percent, seven entries produced from 82 to 89 percent, and nine entries produced from 91 to 96 percent prime tubers.

Thirteen seedlings were significantly higher than the check Kennebec in specific gravity readings. Three of these were in the same range as B5141-6. B5647-8 and B5698-8 were significantly lower in specific gravity than Kennebec. B6595-12 and B6495-20 had specific gravity readings of 1.106 and 1.101 respectively.

Chip color readings were taken on samples after four months of 50°F storage. Seven of the entries failed to make acceptable potato chips.

Samples were reconditioned at 70°F for 2 weeks after four months storage at 40°F. Six entries made acceptable chips. Samples were also fried after four months of 40°F storage. Two entries produced acceptable potato chips. One entry, B6516-3, which produced acceptable chips after 40°F did not make acceptable chips at 50°F (7.2). This is probably due to sampling error as only two replications were cooked following the 40°F storage treatment.

All entries were evaluated for french fry color and texture from similar storage conditions. Eight seedlings produced french fries of acceptable color and texture.

After reconditioning at 70°F storage for 2 weeks following four months of storage at 40°F, eight seedlings produced acceptable french fries. Three seedlings produced acceptable french fries after cooking directly from 40°F storage.

P.I. table 14. Potato Chip and Fry Yield Test. Arcostock Farm, Presque Isle, Maine. 1970. 1/

Seedlings Tested	Yield Per Acre over 2 inches	Specific Gravity	Chip Rating		Fry Rating		Fry Tex.
			40°F	50°F	40°F	50°F	
	CWT	PCT					
B5647-8	265	88	7.8	5.0	3.0	1.8	I
B5698-8	319	88	9.0	6.7	4.5	2.6	I
B6562-14	317	91	8.0	7.4	3.6	3.0	I
B5665-7	281	92	8.5	6.4	3.5	3.1	I
B6564-9	280	95	7.1	5.1	3.2	2.3	M
B6564-27	261	89	7.7	5.5	3.2	2.8	M
B6595-12	203	78	8.0	5.3	3.0	2.0	I
B6603-6	297	95	10.0	7.9	3.9	3.3	M
B6603-12	314	82	6.9	6.8	3.4	3.2	M
B6495-20	373	92	10.0	7.3	4.5	3.8	I
B6503-5	283	91	7.7	4.6	2.8	2.0	I
B6516-3	258	87	6.9	7.2	3.2	3.0	M
B6516-10	212	88	8.7	6.5	3.6	3.2	I
B6516-20	304	95	9.0	7.1	4.6	3.2	M
B6516-26	348	96	7.8	7.0	3.5	3.2	M
B6532-4	388	94	10.0	8.1	5.0	3.8	I
B6532-14	248	85	10.0	8.7	4.1	4.4	M
B5141-6	372	92	7.7	7.1	3.0	2.5	M
Kennebec	418	96	8.7	8.0	4.5	3.0	I
LSD 5%	58	04		1.5		0.6	
						0.9	

1/ See footnotes at end of table 6.

BELTSVILLE

R. W. Goth and R. E. Webb

Bacterial wilt and viruses S and X. The combined effect of Pseudomonas solanacearum and meloidogyne incognita larvae on the development of the bacterial wilt disease of potatoes is being studied. In general, those plants subjected to the nematode bacteria combination are more susceptible to wilt.

The reaction of potato breeding lines for their response to the bacterial wilt organism is being evaluated.

Plants of 43 species in 12 families have been evaluated as potential test plants for potato virus S. Only 3 species in 3 families look promising.

Some 2900 plants of over 400 clones were reindexed for viruses S and X through serology to establish foundation stocks free of these viruses.

Air pollution injury to parental stocks. During the spring and early summer of 1970, heavy concentrations of air pollutants were present for sustained periods along the eastern seaboard. One component, SO₂, reached a concentration of over 14 ppm at times. Potato varieties and clones used in breeding were growing at Beltsville, Maryland, in a "breezo" cooled greenhouse during the early part of the above period. PI table 15 records the response of 4 to 12 plants each of 9 varieties and 21 clones to air pollutants through the period January 21 to May 29, 1970.

P.I. table 15. Response of varieties and clones to air pollution in the greenhouse, 1970

Variety	Percent Foliage Injury ^{1/}	Variety	Percent Foliage Injury
Cascade	3.0	Saco	53.0
Katahdin	25.0	Cherokee	63.0
Cobbler	36.0	Teton	75.0
Abnaki	38.0	Peconic	85.0
Norgold Russet	38.0		
<u>Clones</u>		<u>Clones</u>	
A6334-20	0.0	B6751-3	8.0
A6371-2	0.0	B6327-11	15.0
A63126-2	0.0	B4829-7	18.0
BR6260-4	0.0	B6116-18	23.0
B4087-5	0.0	B6541-2	25.0
B6376-6	0.0	B6741-2	25.0
A6371-3	3.0	B6519-3	28.0
A6334-19	4.0	B6548-1	45.0
B6044-14	5.0	B6377-12	50.0
B6024-3	5.0	B5141-6	83.0
A59325-2	6.0		

^{1/} Dr. H. E. Heggstad, Air Pollution Laboratory, participated in the evaluations.

DISEASE RESISTANCE EVALUATIONS

Robert Young, David Wilson, R. E. Webb

The U.S.D.A. potato disease testing program is an important part of the overall potato improvement program. In 1970, 131 advanced seedlings were evaluated for their reaction to 9 important potato diseases. In addition to these, 72 clones were selected from the various disease tests in 1969 and were reevaluated for resistant reactions to selected potato diseases. These data are presented in the accompanying tables, Aroostook Farm (A.F.) tables 1 and 2.

In any given year of testing only the very susceptible seedlings can be evaluated with any degree of accuracy. Understandably, these lines can be discarded rather easily. However, those lines showing a resistant or tolerant reaction should be exposed to the disease situation for several years under varying weather conditions. In this manner a more accurate prediction can be made as to how a particular seedling will perform under differing environmental stresses. A survey of A.F. table 2 will bear out the importance of this consideration. These lines listed in table 2 were judged to be resistant to one or more diseases in the 1969 test.

Procedures for each disease test and the results are presented in the following discussion and tables. Results of the ring rot and spindle tuber test will be found in the Maine report by Donald Merriam and others.

Bacterial Diseases

Resistance to Common Scab. The 1970, scab test was an excellent one. Soil moisture conditions during the period of tuber initiation were near optimum for potato scab development. The variety Green Mountain, used as a susceptible check, showed heavy scab development (5/5, A.F. table 1) compared to B6703-2(%), B6775-4(%), B6799-1(2/1), BR6820-1(1/1) and BR6900-2(1/1), which were either free of scab or indicated only traces of scab. Average scab readings as well as the most severe rating are presented in A.F. table 1.

Resistance to Verticillium wilt caused by Verticillium albo-atrum Reinke and Berth.

Verticillium wilt is one of the more important soilborne fungus diseases of the potato. Unfortunately, most of the major production areas in the United States experience problems from this pathogen. Incorporation of wilt resistance into potential varieties is highly desirable.

Inoculum for this test was grown in potato dextrose broth in shake culture. Bud cells were harvested by centrifugation, resuspended and adjusted to about 80,000 cell per ml. Two (2) isolates of the pathogen were used to insure pathogenicity. Tubers of the test clones were freshly cut, dipped into the inoculum and planted immediately into performed rows. The inoculated seedpieces were lightly covered with soil and a full hill was applied after planting was complete.

Foliage readings were made on 8/27/70 see A.F. table 1. Generally, the readings were somewhat lower than the 1969 test. This situation was not entirely unexpected since temperatures for the months of July and August ranged from 4°-11°F and 1°-10°F above normal, respectively. The isolates of V. albo-atrum used in this test have an optimum temperature of about 68°F. The higher temperatures during the 1970 test period would tend to reduce the overall aggressiveness of the pathogen and hence result in lower disease ratings. For example, Cherokee and Kennebec (susceptible checks) in a more normal year would show vine ratings of 9+ and 8, respectively. This year, however, these two varieties had vine ratings of about 5.0 (see table 1). Nevertheless, several lines performed very well when compared to the resistant Houma and Abnaki, A.F. tables 1 and 2.

Resistance to Pink Eye Caused by Pseudomonas sp.

Although pink eye is caused by a bacterium the symptoms which develop on the tuber have, in past, been associated with Verticillium wilt. The data presented in table 1 would not support a very strong relationship of the two diseases. However, in general, where wilt was more severe (higher vine rating), there are likely to be a higher percentage of pink eye tubers. Compare the susceptible checks Cherokee, Kennebec, to the resistant Houma for this general relationship.

Resistance to Early Blight Caused by Alternaria solani (Ell. and G. Martin) Sor.

Early blight of potato has become a major disease problem in certain production areas. In 1970, several commercial fields in northern Maine died prematurely from severe infections of A. solani. The importance of early blight-resistant varieties is manifested by the fact that existing chemical control measures and/or spraying techniques apparently are not effectively controlling this disease.

This field test consisted of 3-hill plots replicated twice with the guard rows and every third row throughout the plot planted with a susceptible clone. The entire plot was inoculated with a heavy spore suspension of the pathogen during the last week in July. Evaluations were made on 8/27 and again on 9/29. Data from the early blight test are presented in A.F. tables 1 and 2. Sister clones B6712-9 and B6712-18 demonstrated a strong resistant reaction on 8/27 and again on 9/29 when the final evaluations were made. In general, those lines showing 20% infection or less on 8/27 were rated as resistant on 9/29 also. Kennebec was 30-40% defoliated on 9/29 whereas Alamo and Cherokee were dead from early blight.

Resistance to Potato Late Blight, Race-0 of Phytophthora infestans (Mont.) de Bary.

All of the advanced seedlings were screened for resistance to the common race (R-0) of P. infestans. Each clone was replicated twice with 2 hills per replication. The variety Green Mountain was planted in the outside guard rows and every third row throughout the plot. The entire plot was inoculated with a zoospore-sporangial suspension on 7/15, 7/29, and 8/6. With each inoculation lesions

developed which supported some sporulation. Late blight developed slowly and in some cases the hot weather arrested lesion development completely. A massive inoculation was made on 8/17 and by 9/10 blight had developed to the extent that an evaluation could be made. Approximately 50 clones were highly resistant to R-0 of P. infestans, indicating the presence of at least 1 major gene. Sixteen host differentials were included in the test plot and all except the homozygous recessive and R-4 indicator remained free of late blight indicating that R-0 and R-4 were the only races present when the evaluations were made.

Multigenic Resistance to Race-1, 2, 3, 4 of P. infestans.

The multigenic tests are normally conducted in Huttonsville, West Virginia, and Oxbow, Maine. This year, however, because of the proximity of water, the Maine planting was split with the early planting being made on the Rogers Farm in Old Town, Maine, and the late planting at the original Oxbow site. As in the past the guard rows and every third row (spreader rows) throughout the plot were planted with susceptible clones which vary slightly with respect to multigenic resistance. The varieties Green Mountain (no multigenic resistance), Kennebec (moderate-low multigenic resistance) and Sebago (moderate multigenic resistance) were alternately planted in the spreader rows, thus insuring a continual discharge of inoculum throughout the test period. Inoculations of the spreader rows only were made on 7/16, 7/22, 8/3, and finally a massive inoculation of the entire plot was made on 8/21. With temperatures approaching the 100°F mark occasionally and daily temperatures ranging into the 90's late blight failed to develop. The Oxbow planting was inoculated twice without success, lesions developed but the pathogen failed to establish itself in the plot.

On the Rogers Farm late blight developed slowly and by the second week in September it had developed to the point where an evaluation could be made. Obviously, by this late date and without benefit of protective sprays early blight had developed extensively making some determinations impossible. The data presented in table 1 is supported by the data from the West Virginia plantings and taken together indicate the performance of those clones tested.

In spite of the adverse conditions under which the 1970 late blight test was conducted, several clones demonstrated acceptable levels of multigenic resistance. Seedling reactions are presented in A.F. table 1, however, special attention is drawn to clones B6679-6, B6703-2, B6705-12, B6745-6, B6750-7, B6761-9, B6761-11, and B6761-12. These seedlings plus several others performed very well and should be reevaluated in 1971.

Virus Diseases

For the most part the virus tests are conducted in small field plots under lumite-screen cages which measure 24' x 12' x 6'. This year, however, because of the number of seedlings included in the disease screen, the virus-A and virus-X tests were conducted in greenhouse soil benches.

Immunity to Potato Virus X (P.V.X.). In this test, seedlings were routinely sap inoculated with a virulent strain of P.V.X., and then later indexed visually and by the local lesion indicator, Gomphrena globosa. In 1970, 24 of the 131 seedlings tested proved negative for the virus when indexed on Gomphrena (see A.F. table 1).

Resistance to Leafroll Virus and Net Necrosis. The leafroll tests were also conducted in lumite-screen cages. Virus infected tubers were planted between tubers of healthy seedlings. When the plants reached a height of 6"-8" the virus source plants were infested with aviruliferous green peach aphids. Following a sufficient acquisition and feeding period the aphids were destroyed and evaluations were made. All questionable seedlings were grown in the greenhouse. The results of this test and the net necrosis test are presented in A.F. tables 1 and 2. The net necrosis part of the leafroll test was conducted in a manner similar to the above except the plants were not infested with viruliferous aphids until the tubers had developed to about the size of a walnut. The tubers were stored until about midwinter when the stolen ends are clipped and net determinations made.

Aroostook Farm Table 1. Evaluation of 131 advanced seedlings for response to 9 common potato pathogens.

Pedigree	1970 Key No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N
		Virus X	Leafroll Virus	Net Necrosis	Average Scab reading	Most Severe scab reading	Verticillium wilt reading	Stem-end discoloration	Pink eye	Late Blight Polygenic Maine	Late Blight Polygenic West Virginia	Late Blight Race-O Maine	Early Blight % Infection	Early Blight Lesion Size	Early Blight P.L. Cond.
B6679-6	1	+	+	0/27	3/1	4/2	5.2	43/49	30/39	3+	2+	0	50	2	3.0
B6682-2	2	+	+	0/24	4/2	4/4	2.9	29/51	4/51	4	5	3+	50	2.5	3.5
B6685-3	3	+	+	0/18	5/2	5/3	4.7	8/52	0/52	5	5	5	65	2.5	3.5
B6692-1	4	+	+	0/16	5/4	5/5	1.8	24/45	3/45	3+	4	0	50	2.5	2.5
B6692-5	5	+	+	0/21	4/2	5/4	2.6	19/59	5/59	4+	5-	0	50	3.0	4.0
B6692-9	6	+	+	0/16	4/2	5/1	3.0	39/46	7/46	4	4+	4+	25	1.5	2.0
B6692-18	7	+	+	0/17	4/2	5/1	2.7	14/30	2/30	4-	4+	5	35	2.0	2.0
B6692-19	8	+	+	0/18	5/2	5/4	1.8	29/37	0/37	4+	4+	5	45	3.0	2.0
B6692-22	9	+	+	0/18	2/2	4/4	3.5	20/33	12/33	4	4+	5	50	2.0	3.5
B6692-27	10	+	+	0/35	5/2	5/3	3.7	20/40	14/40	4+	5-	4-	35	2.0	2.5
B6694-4	11	+	+	0/38	5/4	5/5	1.5	16/48	0/48	3+	4+	4	35	3.0	3.5
B6695-1	12	+	+	0/37	2/1	3/1	1.3	6/27	0/27	3+	4+	0	35	2.0	2.5
B6696-3	13	+	+	0/32	4/3	5/4	2.3	22/35	3/35	3+	4-	4	25	2.0	2.5
B6698-19	14	+	+	0/33	4/3	4/3	2.8	25/44	15/44	3	4	0	45	2.5	3.5
B6703-2	15	+	+	0/17	0/0	0/0	5.0	18/18	4/18	3-	2-	0	70	3.0	4.0
B6705-10	16	+	+	0/27	3/3	5/5	4.5	4/15	0/15	3+	5-	2-	20	2.0	4.0
B6705-12	17	+	+	0/12	4/3	5/4	1.5	7/31	1/31	3	3	0	60	3.0	3.5
B6708-1	18	-	+	0/17	5/3	5/4	5.0	32/55	11/55	4+	5-	5	60	3.0	4.0
B6712-2	19	+	+	0/34	4/3	5/4	2.1	21/30	3/30	3	4+	3-	5	1.5	2.5
B6712-9	20	+	+	0/21	5/5	5/5	2.0	25/43	2/43	4	4+	0	15	1.0	2.0
B6712-17	21	+	+	0/23	5/4	5/4	6.1	24/30	9/30	2	5-	0	30	2.0	3.5
B6712-18	22	+	+	0/24	5/5	5/5	4.6	32/33	20/33	2	4+	2+	10	1.5	2.0
B6712-23	23	-	+	0/22	5/5	5/5	9.2	34/38	11/38	3+	5	5	25	1.5	3.5
B6715-3	24	+	+	0/16	4/2	5/4	3.0	42/48	15/48	4+	4+	5	55	3.0	3.5
B6718-4	25	+	+	0/17	4/2	5/4	2.1	7/32	0/32	4	5	0	30	2.5	2.5
B6718-8	26	+	+	0/16	5/3	5/3	1.6	23/42	9/42	4+	5-	4+	15	2.0	2.5

Aroostook Farm Table 1. Continued

Pedigree	1970 Key No.	Virus X	A	B	C	D	E	F	G	H	I	J	K	L	M	N
					Net Necrosis	Average Scab reading	Most Severe scab reading	Verticillium wilt reading	Stem end discoloration	Pink eye	Late Blight Polygenic Maine	Late Blight Polygenic West Virginia	Late Blight Race-O Maine	Early Blight % Infection	Early Blight Lesion Size	Early Blight P.I. Cond.
B6727-5	27	+			4/21	3/2	5/4	2.1	20/45	2/45	2+	5-	4	25	2.5	2.0
B6731-2	28	-			0/27	5/3	5/3	5.8	43/73	2/73	0	4	-	85	3.0	7.0
B6731-3	29	+			0/34	5/3	5/5	4.6	50/77	14/77	4+	4+	3	35	2.0	3.0
B6739-2	30	+			0/18	4/1	4/1	1.0	23/42	6/42	4	4+	0	55	2.5	3.0
B6741-2	31	+			0/24	5/4	5/5	5.6	22/45	4/45	4	5-	0	65	2.5	3.5
B6741-3	32	+			0/22	5/3	5/4	3.9	22/46	2/46	2+	5	2-	35	2.0	3.0
B6741-22	33	+			2/29	3/2	3/2	2.7	52/71	9/71	3+	4+	0	15	1.5	2.5
B6741-23	34	+			0/23	2/1	3/1	3.0	18/48	2/48	3+	5	1	10	2.0	2.5
B6743-3	35	+			0/19	3/2	3/2	3.5	26/41	6/41	4	5	3	40	2.0	2.5
B6745-6	36	+			0/10	5/5	5/5	1.1	12/38	1/38	2+	2	1	20	2.5	2.0
B6747-5	37	+			0/13	3/1	3/1	1.9	10/31	1/31	4	4+	4+	20	2.0	1.5
B6750-3	38	+			0/30	4/1	5/2	2.3	8/53	4/53	4	5	0	15	2.0	2.5
B6750-7	39	+			0/28	5/4	5/4	1.2	31/65	6/65	3	2+	0	45	3.0	4.0
B6751-3	40	+			0/31	3/2	4/2	3.8	31/52	5/52	3+	4+	5-	30	1.5	3.0
B6759-3	41	+			0/7	5/3	5/4	1.2	25/35	0/35	3+	3+	0	55	1.5	2.5
B6761-1	42	+			0/21	4/1	5/2	3.9	37/66	5/66	4+	5-	0	50	2.0	2.5
B6761-9	43	+			2/48	3/1	4/2	8.5	19/22	8/22	2-	3-	0	20	1.5	2.0
B6761-11	44	+			3/24	2/1	3/1	2.2	42/52	7/52	0	1	0	25	2.0	2.5
B6761-12	45	+			0/19	4/2	4/4	3.7	33/59	6/59	2	2+	0	Trace	1.0	1.5
B6772-5	46	+			0/16	5/3	5/4	1.2	21/76	3/76	3+	4	4-	15	2.0	2.5
B6764-2	47	+			0/31	4/3	4/4	3.8	23/60	3/23	3+	2+	1	55	3.0	4.5
B6774-6	48	+			0/44	5/3	5/3	6.3	35/58	6/58	3	5	0	35	2.0	3.5
B6775-4	49	+			0/26	0/0	0/0	1.2	8/41	2/41	4	4	1	45	3.0	4.5
B6782-1	50	-			0/27	4/3	5/3	2.9	13/42	7/42	3+	4	2-	40	2.5	3.5
B6797-2	51	-			2/29	4/2	4/3	2.2	21/44	0/44	2-	4	2+	15	2.5	3.0
B6799-1	52	-			0/29	1/TR	2/1	4.6	35/62	11/62	4	5	4+	65	3.0	5.5
B6799-5	53	-			0/18	4/2	5/2	5.8	52/66	14/66	3+	3-	0	40	2.5	3.5

Aroostook Farm Table 1. Continued

Pedigree	1970 Key No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N
		Virus X	Leafroll Virus	Net Necrosis	Average Scab reading	Most Severe scab reading	Verticillium wilt reading	Stem-end discoloration	Pink eye	Late Blight Polygenic Maine	Late Blight Polygenic West Virginia	Late Blight Race-O Maine	Early Blight % Infection	Early Blight Lesion Size	Early Blight P.L. Cond.
B6814-16	54	+	+	0/17	3/2	4/3	3.1	13/43	2/43	4	5	5	50	2.5	3.5
B6815-14	55	+	+	0/26	4/2	4/2	3.6	20/39	4/39	2+	3+	0	55	3.0	3.5
B6815-19	56	+	+	4/18	4/1	5/1	4.4	41/46	1/46	3	3	0	15	2.0	3.5
BR6820-10	57	-	+	0/25	3/1	3/2	5.3	55/68	16/55	3+	3	0	35	2.5	3.0
Cherokee	58	+	+	-	2/1	3/1	5.1	-	-	3+	3	4-	60	2.5	4.5
Kennebec	59	+	+	-	2/1	2/1	4.5	-	-	3+	2+	0	40	2.5	3.5
Houma	60	+	+	-	4/2	4/3	1.9	-	-	4	4	5	25	2.5	3.0
BR6820-14	61	-	+	0/20	1/TR	1/1	2.8	18/37	2/37	4	5-	3-	20	2.0	1.5
BR6820-15	62	+	+	1/32	3/2	5/3	1.8	13/41	1/41	4	2+	0	50	3.0	3.5
BR6820-24	63	-	+	0/51	5/4	5/4	5.7	35/50	6/50	3+	5	0	65	3.0	4.5
BR6820-26	64	+	+	0/44	3/2	3/2	2/6	29/54	4/54	3+	5	0	70	3.0	3.5
BR6820-29	65	-	+	3/35	4/2	5/5	2.2	17/77	2/77	3+	3+	0	55	2.5	2.5
BR6822-5	66	+	+	0/29	2/1	4/2	5.2	29/35	12/35	4	5	0	25	2.5	3.5
BR6824-1	67	+	+	0/20	5/4	5/5	4.1	25/58	1/58	2+	5	5	35	3.0	3.5
BR6831-5	68	-	+	0/18	5/3	5/5	5.7	33/47	5/47	4	5	5	50	2.5	4.0
BR6834-1	69	+	+	0/21	4/3	5/4	2.0	29/35	8/35	4	5	5	55	3.0	4.0
BR6848-4	70	+	+	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.
BR6851-2	71	-	+	0/20	3/2	5/5	6.9	21/45	15/45	5	5	5	80	3.0	6.0
BR6854-4	72	+	+	0/34	5/3	5/3	3.5	28/46	5/46	3+	5	5-	50	2.5	3.0
BR6858-2	73	+	+	0/19	4/3	5/4	2.4	23/39	9/39	3+	5	5-	80	3.0	6.5
BR6858-5	74	+	+	0/17	5/5	5/5	2.3	22/36	2/36	4	5	5	50	3.0	6.0
BR6859-3	75	+	+	2/16	5/4	5/5	2.5	27/43	4/43	3	5	0	70	3.0	4.5
BR6859-6	76	+	+	0/18	5/3	5/5	2.0	20/27	3/27	0	5	5	70	3.0	6.0
BR6862-2	77	+	+	0/23	4/4	5/4	1.9	13/43	0/43	4+	5	0	45	3.0	4.5
BR6863-2	78	+	+	0/11	3/2	4/3	3.7	9/16	0/16	5	5	0	65	2.0	5.0
BR6863-3	79	+	+	2/14	5/3	5/4	2.9	24/44	1/44	3+	5	2-	35	2.5	3.0
BR6863-4	80	+	+	0/18	5/3	5/4	1.8	25/38	8/38	3	5	0	50	2.5	4.5

Aroostook Farm Table 1. Continued

Pedigree	1970 Key No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N
		Virus X	Leafroll Virus	Net Necrosis	Average Scab reading	Most Severe scab reading	Verticillium wilt reading	Stem-end discoloration	Pink eye	Late Blight Polygenic Maine	Late Blight Polygenic West Virginia	Late Blight Race-O Maine	Early Blight % Infection	Early Blight Lesion size	Early Blight P.L. Cond.
BR6863-7	81	+	+	0/33	3/2	5/3	3.2	34/61	2/61	2	4+	1-	35	2.0	3.5
BR6863-8	82	+	+	0/24	4/3	5/5	3.7	21/46	4/46	3+	5	5	25	2.0	3.0
BR6864-8	83	+	+	0/21	5/2	5/4	2.4	25/56	6/56	4+	5	4+	35	2.5	3.5
BR6864-9	84	+	+	0/27	3/3	5/4	4.3	26/34	8/34	3+	3	0	45	2.5	3.5
BR6871-5	85	+	+	0/40	4/3	5/4	3.6	15/27	4/27	4-	3	0	45	2.5	4.5
B6878-2	86	-	-	0/31	3/1	4/1	5.2	40/52	15/52	4-	4+	5-	55	3.0	3.5
B6879-5	87	+	+	1/25	4/2	5/5	1.3	12/53	3/53	3	4+	3+	35	2.5	3.5
B6879-11	88	+	+	0/29	3/1	4/2	2.3	22/51	1/51	3+	5	3	15	2.0	3.5
B6887-1	89	+	+	0/16	4/3	4/4	4.8	45/55	24/55	3+	4+	3+	55	2.5	4.5
B6887-5	90	+	+	0/28	5/4	5/4	4.3	32/37	9/37	4-	3+	0	55	3.0	3.5
B6887-6	91	-	+	3/21	2/1	3/1	4.4	35/41	21/41	3+	5	0	30	2.5	4.5
B6887-12	92	+	+	0/32	4/2	5/2	4.1	39/53	15/53	4-	5	0	70	2.5	4.0
B6887-16	93	-	-	0/28	4/4	5/5	7.5	20/27	13/27	4	3+	0	40	2.5	4.5
B6892-1	94	+	+	0/26	5/3	5/5	3.7	38/46	29/46	3+	4+	0	75	3.0	4.0
BR6900-2	95	+	+	0/22	1/1	1/1	4.8	35/55	18/55	3+	4+	4+	70	2.5	4.5
BR6463-1	96	+	+	0/19	5/5	5/5	3.6	31/45	11/45	3+	4	0	85	2.5	4.5
BR6425-2	97	+	+	0/14	5/5	5/5	3.3	11/27	1/27	4	5	0	70	3.0	4.5
BR6480-3	98	+	+	0/32	5/4	5/5	1.1	10/64	0/64	4-	3+	0	35	2.5	3.5
BR6486-1	99	+	+	0/22	5/3	5/4	5.2	22/34	11/34	3+	3+	0	40	3.0	3.5
BR6488-1	100	-	-	0/39	4/3	5/4	3.2	12/28	7/28	2+	4	2+	55	3.0	4.0
BR6491-1	101	-	-	0/20	5/5	5/5	4.3	35/51	13/51	3+	5	5	85	3.0	7.5
BR6491-5	102	-	-	0/31	5/4	5/5	4.0	22/41	2/41	4	5	0	45	3.0	4.0
BR6491-6	103	+	+	0/15	5/3	5/4	1.7	30/46	1/46	3+	4+	0	50	2.0	3.5
BR6491-9	104	+	+	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.	N.T.	3+	N.T.	N.T.	N.T.	N.T.
B6495-12	105	+	+	0/35	4/4	5/4	3.6	42/58	20/58	3+	4+	0	40	3.0	3.5
B6495-14	106	+	+	0/22	3/1	3/2	2.6	28/37	16/37	3	4+	0	45	3.0	4.5
B6495-20	107	+	+	0/22	4/3	5/3	4.6	47/60	26/60	3+	4+	0	70	3.0	6.0

Aroostook Farm Table 1. Continued

Pedigree	1970 Key No.	A	B	C	D	E	F	G	H	I	J	K	L	M	N
		Virus X	Leafroll Virus	Net Necrosis	Average Scab reading	Most Severe scab reading	Verticillium wilt reading	Stem-end discoloration	Pink eye	Late Blight Polygenic Maine	Late Blight Polygenic West Virginia	Late Blight Race-O Maine	Early Blight % Infection	Early Blight Lesion size	Early Blight P.L. Cond.
B6502-1	108	+	+	0/11	5/4	5/4	2.9	24/42	2/42	4	5	5	70	3.0	6.0
B6503-5	109	+	+	0/18	5/5	5/5	3.8	54/60	9/60	4	5	5	45	2.0	3.5
B6516-3	110	+	+	0/19	4/2	5/4	5.1	42/48	17/48	4	5	5	80	2.5	5.0
B6516-5	111	+	+	0/22	5/5	5/5	3.2	36/55	7/55	4+	5	5	55	2.5	5.0
B6516-10	112	+	+	0/18	5/4	5/5	2.2	18/32	3/32	3+	5	4+	40	2.0	3.0
B6516-15	113	+	+	0/24	5/3	5/4	2.2	13/33	5/38	3+	5	4+	50	3.0	4.5
B6516-18	114	+	+	0/25	4/3	5/5	2.6	16/30	0/30	3+	5	4+	40	2.5	3.5
B6516-20	115	+	+	0/14	5/4	5/5	3.9	24/30	7/30	3+	4+	4+	25	1.5	3.5
B6516-26	116	+	+	0/26	4/3	5/5	4.6	19/47	18/47	3+	5	0	55	2.0	4.0
B6516-28	117	+	+	0/17	5/4	5/4	3.2	19/39	8/39	3	4+	3	45	2.5	3.5
Cherokee	118	+	+	24/46	3/1	3/1	4.5	85/106	26/106	3+	-	4-	70	2.5	6.0
Kennebec	119	+	+	18/45	3/2	5/4	4.5	86/118	48/118	4	-	0	20	2.5	3.0
Houma	120	+	+	0/38	3/1	3/2	1.8	48/120	14/120	4	-	4+	30	2.5	3.5
B6518-10	121	+	+	0/28	4/3	5/4	4.6	41/54	25/54	3+	4-	3-	25	2.5	2.5
B6532-3	122	+	+	0/29	4/2	5/4	1.9	25/53	4/53	4	5	0	65	3.0	5.5
B6532-4	123	-	+	0/24	4/3	5/4	1.4	4/41	1/41	4-	5	5-	60	3.0	4.5
B6532-10	124	-	+	0/24	5/3	5/5	1.5	20/68	4/68	4	4	5-	70	3.0	5.0
B6532-14	125	+	+	0/38	4/2	5/3	4.7	45/69	31/69	4+	5	5-	70	3.0	5.5
B6544-4	126	+	+	0/19	2/1	4/3	1.3	9/47	1/47	4+	5	0	35	2.0	3.5
B6548-3	127	+	+	0/22	1/1	3/2	2.6	16/31	2/31	3	2+	0	15	2.0	3.5
B6553-15	128	+	+	0/27	5/4	5/4	2.8	11/34	7/34	3+	3+	0	55	3.0	4.0
B6553-28	129	+	+	0/23	4/3	5/5	3.2	19/38	4/38	3+	5	5	65	2.5	4.5
Iopride	130	+	+	1/20	2/Tr.	2/1	4.5	23/41	8/41	4	5	5	40	2.5	3.5
245-2	131	+	+	0/26	3/Tr.	3/1	4.1	26/53	10/53	4+	4+	0	65	2.5	4.5
Green Mountain		+	+	24/46	4/3	5/5									
Green Mountain		+	+	4/4	4/4	5/3									
Green Mountain		+	+	4/3	4/3	4/4									
Mohawk		+	+	18/45											
Katahdin		+	+	0/38											

Explanation of Aroostook Farm Table 1

1. A. Potato virus X.
2. B. Potato leafroll virus.
3. C. Net necrosis, no. of tubers with net symptoms over the total number of tubers examined.
4. D. Potato scab, mean value of 3 replications.
5. E. Potato scab, most severe scab rating.
6. F. Verticillium wilt, plants were evaluated on the basis of photosynthetic area destroyed: 1 = no disease, 10 = plants dead. The value reported represents the mean of 20 plants from 4 replications.
7. G. Stem-end discoloration, (S.E.D.), the ratio listed is the number of tubers with typical S.E.D. over the total number of tubers examined.
8. H. Pink eye, the value listed is the number of tubers showing pink eye symptoms over the total number of tubers examined.
9. I and J., Late blight, expression of polygenic resistances to race - 1,2,3,4 of P. infestans: 0 = no blight, 5 = plants dead from late blight.
10. K. Major gene influence on race - 0 of P. infestans: 0 = no blight, 5 = plants dead.
11. L. Early blight, percentage of foliage showing typical target spots lesions of Alternaria solani.
12. M. Early blight, lesion type: 0 = no lesions, 1 lesion up to $\frac{1}{4}$ ", 2 = lesions up to $\frac{1}{2}$ ", 3 = large and spreading lesions and stem lesions.
13. N. Early blight, plant condition: 1 = healthy plant, 10 = plants dead.

Arcoostook Farm Table 2. Reevaluation of 72 advanced seedlings for reaction to selected potato pathogens.

Pedigree	A		B		C		D		E		F		G	
	Net	Necrosis	Vert. Wilt		Stem-End		Pink		Early Blight		Early Blight		Early Blight	
			Foliage	Readings	Discoloration	Eye	% Infection	Lesion Type	P.L. Cond.					
B5267-2	0/29		2.7		25/55	10/55	45	2.0		5.5				
B5299-39	0/19		1.8		13/32	4/32	25	1.5		3.5				
B5408-2	0/37		5.4		27/35	6/35	25	2.0		4.0				
B5458-6	0/23		1.7		22/36	9/36	30	1.5		3.5				
B5461-4	0/28		3.0		25/44	12/44	15	2.5		3.0				
B5698-8							20	2.0		2.5				
B5735-5			4.3		36/65	13/65	65	2.0		5.5				
BR5948-1							30	2.0		3.5				
BR5960-13			3.5		19/45	5/45	Tr.	1.5		2.5				
BR5960-5							40	2.5		3.5				
BR5967-7							30	2.0		3.5				
B6023-3							35	2.5		3.5				
B6024-3														
B6044-14							10	1.0		2.0				
BR6246-1	2/31													
BR6261-1	0/16													
BR6263-2	0/34													
BR6265-8	3/30													
BR6273-1	0/27		3.2		18/34	2/34	15	2.0		3.0				
BR6290-3	0/24													
BR6290-9	0/19		2.6		16/32	0/32								
BR6293-12	0/35													
BR6306-22	0/21													
BR6315-4	0/39													
BR6316-4	0/21													
BR6316-5	2/18													
BR6317-21	0/27													
BR6317-25	0/30													
BR6320-1	6/29													
B6330-3	0/30													
B6359-1	0/16													
B6376-6	0/8													

Arcoostook Farm Table 2. Continued

Pedigree	A Net Necrosis	B Vert. Wilt Foliage Readings	C Stem-End Discoloration	D Pink Eye	E Early Blight % Infection	F Early Blight Lesion Type	G Early Blight P.L. Cond.
BR6442-1	0/17	3.4	17/33	7/33			
B6493-14	0/7	3.7	6/17	1/17			
B6516-19	0/22				10	1.0	2.5
B6516-27	0/18	2.6	8/34	1/34	65	2.0	3.5
B6518-4	0/25						
B6518-5	0/20						
B6518-8	0/26						
B6519-3	0/16	3.0	21/45	10/45			
B6519-5	0/24						
B6519-6	0/23				15	1.5	2.5
B6527-33	0/29						
B6529-12	0/22						
B6534-2	4/21						
B6535-10	0/30	3.6	36/53	16/53			
B6537-4	0/20						
B6545-7	5/30						
B6545-20	0/22						
B6547-7	0/22						
B6548-1	0/9						
B6558-2	0/16						
B6558-16	0/15						
B6562-14	0/19						
B6562-22	4/21						
B6564-9	0/18	3.6	16/37	5/37	Tr.	1.0	2.5
B6565-2	0/29						
B6567-12	0/23	1.8	3/30	1/30	5	1.5	3.0
B6573-11	0/33						
B6573-25	0/13						
B6581-4	0/31						
B6581-15	0/34						
B6581-17	0/51						
B6587-8	0/39				15	1.5	3.5
B6587-11	0/24						
B6591-7	3/26	1.8	11/51	0/51			

Aroostook Farm Table 2. Continued

--	A	B	C	D	E	F	G
Pedigree	Net Necrosis	Vert. Wilt Foliage Readings	Stem End Discoloration	Pink Eye	Early Blight % Infection	Early Blight Lesion Type	Early Blight P.L. Cond.
B6595-5	0/18	1.1	10/35	0/35			
B6596-1	0/26						
B6597-20	0/16						
B6599-1	0/12						
B6603-6	0/23	1.1	4/33	0/33			
B6603-12	0/44	4.4	28/50	24/50			
Green Mountain	14/23						
Katahadin	0/38						
Mohawk	5/15						
Cherokee		5.8	31/39	10/39			
Kennebec		5.1	23/30	12/30			
Abnaki		1.8	20/23	5/23			

Explanation of Aroostook Farm Table 2

1. A. Net necrosis, ratio represents the number of tubers with net necrosis over the total number of tubers examined.
2. B. Verticillium wilt. (Same as Table 1, F).
3. C. S.E.D. (Same as Table 1, G).
4. D. Pink eye - (Same as Table 1, H).
5. E, F, and G. (Same as Table 1, L, M, and N).

INTERREGIONAL POTATO INTRODUCTION PROJECT (IR-1)

R. W. Ross and P. R. Rowe

- a. Introduction of new stock. Twenty-six new stocks were received from 8 counties. Another 24 clones are in quarantine.
- b. Preservation and increase. Seed germination tests were conducted on 387 seed lots. Recently harvested seed samples of 110 introductions are being prepared for shipment to the National Seed Storage Laboratory. Approximately 250 clonal selections were indexed for viruses A, M, S, X, and Y.
- c. Classification. Seedling families of 75 species were used to prepare 292 herbarium specimens. Duplicates were prepared for J. G. Hawkes and C. Ochoa.
- d. Distribution. More than 50 copies of the 1969 issue of the Inventory of Tuber-Bearing Solanum species were distributed. The 1966 Supplement is being revised. Tuber families of 210 introductions were grown and offered for distribution.

Shipments in 1970 totaled 3179 samples of seed and tubers of IR-1 stocks and 400 samples of germ plasm that were developed by the cooperative USDA-Wisconsin Genetics and Cytogenetics Project. These shipments were sent to 17 states and 21 countries.

- e. Evaluation. Chromosome counts were obtained for 495 introductions. Ninety-eight seedling families (1800 plants) were evaluated for tolerance to freezing temperatures at Sturgeon Bay. The first frost did not occur until November 7 and only 56 clones were selected.
- f. Usefulness of findings. The major objective of the Potato Introduction Program is to promote and facilitate the improvement of the commercial potato in the United States by providing a readily available reservoir of useful breedings stocks. Breeders are constantly searching for new sources of superior germ plasm and are conducting incessant researches to incorporate desirable new genes into adapted commercial varieties. Accomplishment of the major objective of this program must be measured largely by the success with which new, improved varieties meet the needs of commercial production.

Five new potato varieties with introductions in their pedigrees were released for commercial production in 1970. One hundred twenty-one of the 127 potato varieties developed and released in the United States since 1932 have two or more foreign introductions in their pedigree. These varieties comprise approximately 65% of the annual seed potato production in the United States.

Basic research programs being conducted in several states and other countries are providing information concerning the potential value and diversity of the Solanum species. In 1970, approximately 18 research papers, 8 abstracts and 4 theses reporting the use of Solanum introductions were noted.

NORTH CENTRAL REGIONAL TRIALS - 1970

NORTH DAKOTA

R. H. Johansen and Cooperators^{1/}

The year 1970 marked the twentieth year that the North Central trials have been conducted. The number of states participating in the trials have varied from year-to-year but in 1970, 12 states participated in the trials with Nebraska growing trials at two locations. The Nebraska trials consisted of one trial grown as a fall crop and the other grown as a late summer crop. Although trials were planted in Indiana and Louisiana, they were lost due to flooding and poor weather conditions.

The number of entries in trials has varied from year-to-year. Generally about sixteen to eighteen advanced selections and three check varieties are grown each year. With the number of states involved, the breeder, researcher and grower has the opportunity to evaluate breeding lines over a wide range of environmental conditions.

During the 1970 season, 8 varieties tested in the North Central Regional now rank in the top twenty varieties grown for certified seed in the United States. This alone speaks well for the value and purpose of the North Central Regional trials.

Recent variety introductions that have been tested in the North Central Regional trials:

<u>Progeny No.</u>	<u>Yr. Released</u>	<u>Released by</u>	<u>Released Name</u>	<u>Parents</u>
B5451-6	1970	U.S.D.A.	Abnaki	X1276-185 x B4116-2

Environmental Conditions

Soil type at each location ranged from clay loam to coarse sand, with the majority of trials being grown on sandy or sandy loam soils. The Louisiana trial was grown on alluvial Mississippi River bottom soil.

Cultural Practices

Fertilizer applications, irrigation, spray programs, vine killing, planting distance are leased on local conditions.

1/

Indiana, C. M. Jones; Iowa, J. Weigle and L. Peterson; Kansas, J. Greig; Louisiana, J. Fontenot; Michigan, N. Thompson; Minnesota, O. Turnquist and F. Lauer; Missouri, V. Lambeth; Nebraska, R. O'Keefe; North Dakota, R. Johansen; Ohio, J. Gauss; South Dakota, C. M. Nagel and C. J. Mankin; Wisconsin, J. Schoennman, D. Kichefski, and S. Peloquin; USDA, R. Webb.

The systemic insecticides Di Syston and Thimet were used quite extensively. Chlordane, Thiocarb, Guthion, Malathion, Toxaphene and Sevin were used by several cooperators later in the season. For blight and foliar diseases, Maneb, Dithane M45, M42, and Polyram were used. Dacthal and Eptam were the most popular herbicides used.

<u>State</u>	<u>Date Planted</u>	<u>Date Harvested</u>	<u>Total Days to Harvest</u>
Iowa	4/9	7/22	105
Kansas	4/6	7/24	110
Michigan	5/5	10/6	124
Minnesota	5/19	9/9	114
Missouri	3/24	8/13	143
Nebraska (fall crop)	5/15	9/22	131
Nebraska (summer crop)	4/8	7/21	105
North Dakota	5/22	9/29	131
Ohio	6/5	10/6	124
South Dakota	5/11	9/23	136
Wisconsin	4/23	9/18	149

The 1970 season was generally quite cool and wet at planting time (April, May, June), and most states experienced some unusual warm summer temperatures. With the exception of a warm period occurring in Nebraska and some other Northern States and cool wet grounds in Missouri at plant time, the growing season was ideal for good potato production. The trial in Indiana and Louisiana was lost due to flooding and poor weather conditions. This was the first time that the North Central Regional trial has experienced the loss of two trials within one year due to weather conditions.

Entries

Entries were received from Nebraska, Louisiana, North Dakota, Minnesota, USDA, Wisconsin, and Michigan. North Dakota supplied the check varieties Norland, Red Pontiac and Irish Cobbler. Missouri did not receive seed of the USDA entries and one Nebraska selection was not planted in Ohio.

Yield

Total and US No. 1 yields are reported in North Central tables 1 and 2. The highest yields were found in Wisconsin, Iowa, and Michigan. South Dakota reported the lowest yield. When considering varieties and locations, there was some differences in the yield reported as Total and US No. 1 yield. ND7196-18 produced the highest total yield with 310 cwt per acre.

Yield US No. 1 (Early Group). ND7196-18 produced the highest yield among the early group. Irish Cobbler and La 22-111 also produced high yields among the early varieties.

Yield US No. 1 (Late Group). Of the late varieties tested, Red Pontiac produced the highest yield. La 51-2, Mich. S503, B5267-2, Wisc. 634, and Wisc. 664 ranked the next highest in yield.

Maturity. Norland was again the earliest maturing entry in the trial. ND6993-13 Russ, Neb. 99.56-4x and B6039-1 reported as being late were found to be as early as some of the reported early maturing entries. B6044-14, Wisc. 634, Wisc. 664, and ND5922-12 were the latest maturing entries. Maturity readings are found in North Central table 3.

Total Solids. B6044-14 produced the highest total solids. Other selections that were found to be high in total solids were Mich. S503, ND6993-13 Russ, Wisc. 664, Wisc. 634, B6039-1 and Minn. 174. Norland and Red Pontiac produced the lowest total solids. All advanced numbered selections in trial produced fairly high total solids. Total solids are found in North Central table 4.

Scab Reaction. Iowa and Missouri reported no scab. Although some selections showed some resistance to scab, no selection equaled Norland in scab resistance. Scab readings were found in North Central table 5. (It is hoped that next season all cooperators will report scab readings as found in table 5.)

Internal and External Defects. For the benefit of the person responsible for the entry, selections with possible weakness are starred. Several selections were found to have a high amount of growth cracking, second growth and hollow heart. Summary of grade defects is found in North Central table 6.

Overall Merit Ratings. Merit ratings are presented for the 1968, 1969, and 1970 season for possible comparisons.

	<u>1963</u>	<u>1969</u>	<u>1970</u>
Norland	24	13	23
Mich. S503	*	*	18
ND7196-18	*	*	17
La 22-111**	*	*	14
Minn. 4086	*	*	12
Wisc. 634	*	*	12

**This selection was tested in the 1966 North Central Regional trial.

*Not entered.

North Central Table 1. Total Yield (cwt. per acre).

Variety	Late Summer												
	Iowa cwt.	Kans. cwt.	Mich. cwt.	Minn. cwt.	Mo. cwt.	Fall Crop Nebr. cwt.	Nebr. cwt.	N. Dak. cwt.	Ohio cwt.	S. Dak. cwt.	Wisc. cwt.	Ave. cwt.	
<u>Early to Med. Early</u>													
Neb. 91.57-H18	300	193	394	198	214	303	250	209	139	51	578	257	
Ia. 22-111	249	175	476	231	231	375	265	190	129	125	633	280	
ND7196-18	355	358	468	198	284	328	267	220	51	151	735	310	
Norland	290	194	462	185	225	283	375	176	79	90	578	267	
Cobbler	271	304	442	169	235	389	358	235	131	74	584	290	
<u>Medium to Late</u>													
Minn. 174	254	199	260	173	215	259	267	204	115	105	566	238	
Minn. 1317	261	201	372	140	172	336	190	165	135	51	556	234	
Minn. 4086	318	188	325	194	200	373	267	209	112	102	730	274	
B5267-2	290	200	387	189		358	271	230	136	151	660	287	
B6039-1	209	142	455	147		315	197	136	147	75	458	228	
B6044-1	184	228	504	169		373	228	177	143	127	626	276	
Wisc. 634	256	207	526	173	183	434	204	147	157	61	708	278	
Wisc. 664	313	272	395	192	189	383	186	203	151	126	684	281	
Nebr. 99.56-4X	332	235	345	162	206	250	263	226		97	511	263	
Nebr. 92.56-4	232	167	378	200	140	372	227	193	130	60	606	246	
Ia. 51-2	338	260	497	205	223	302	283	211	121	153	632	293	
Mich. S709	230	148	542	150	185	386	232	130	155	58	567	253	
Mich. S503	314	275	399	172	281	349	247	201	172	78	746	294	
ND6993-13 Russ	234	246	403	193	201	311	234	216	117	97	636	263	
ND5922-12	186	247	407	194	184	389	239	225	108	64	734	271	
Red Pontiac	281	226	661	215	222	387	189	207	218	146	600	305	
Average	271	222	433	183	211	345	249	196	132	97	625		

North Central Table 2. U.S. No. 1 Yield

Variety	Iowa		Kans.		Mich.		Minn.		Mo.		Fall Crop		Late Summer		N. Dak.		Ohio		S. Dak.		Wisc.		Ave.	
	cwt.		cwt.		cwt.		cwt.		cwt.		Nebr..	cwt.	Nebr..	cwt.	cwt.		cwt.		cwt.		cwt.		cwt.	
<u>Early to Med. Early</u>																								
Neb. 91.57-H18	236		142		377		138		201		196		175		202		130		44		533		216	
Ia. 22-111	140		157		471		216		222		189		110		186		121		112		609		230	
ND7196-18	291		204		419		114		261		218		99		189		41		91		671		236	
Norland	214		143		438		151		213		241		272		169		65		62		538		228	
Cobbler	201		266		412		137		223		223		222		222		116		65		534		238	
<u>Medium to Late</u>																								
Minn. 174	188		153		246		147		209		131		173		191		103		82		538		196	
Minn. 1317	199		151		364		92		161		175		102		155		104		42		517		187	
Minn. 4086	188		119		314		115		186		276		154		194		99		86		693		220	
B5267-2	167		168		370		152				190		174		221		129		128		641		234	
B6039-1	140		57		437		108				196		154		126		127		60		433		184	
B6044-14	127		199		484		121				168		142		166		134		115		602		226	
Wisc. 634	214		172		517		148		176		148		148		136		147		50		686		231	
Wisc. 664	221		211		363		148		177		214		127		193		138		106		656		232	
Nebr. 99.56-4X	257		131		325		94		185		150		129		212				73		450		201	
Nebr. 92.56-4	172		125		371		179		129		209		151		181		125		49		577		206	
Ia. 51-2	268		221		466		168		217		143		173		202		103		141		613		247	
Mich. S709	190		107		529		127		171		66		117		125		142		45		538		196	
Mich. S503	238		228		377		129		269		174		178		184		162		63		710		247	
ND6993-13 Russ	110		164		384		144		186		141		141		207		100		75		590		204	
ND5922-12	121		194		394		125		176		258		151		217		92		51		683		224	
Red Pontiac	211		181		650		197		206		190		130		198		205		127		572		261	
Average	195		166		415		141		198		186		153		185		119		79		590			

North Central Table 3. Maturity Classifications.

Variety	Iowa	Kans.	Mich.	Minn.	Mo.	Late Summer		Ohio	S. Dak.	Wisc.	Ave.
						Fall Nebr.	Nebr.				
<u>Early to Med. Early</u>											
Neb. 91.57-H18	2.0		3.0	1.5	2.0	2.5	4.0	2.3	3.0	1.1	2.1
Ia. 22-111	3.0	2.0	3.0	3.0	2.3	2.5	5.0	2.8	3.0	1.0	2.8
ND7196-18	2.0	4.0	3.0	2.5	2.3	4.0	4.0	2.0	2.0	3.2	2.9
Norland	1.0	1.0	2.5	1.0	1.5	3.0	4.0	2.0	1.0	1.2	1.8
Cobbler	3.0	2.0	2.5	2.5	2.2	4.0	4.0	2.0	1.0	1.2	2.4
<u>Medium to Late</u>											
Minn. 174	4.0	4.0	2.5	3.5	2.0	3.0	4.5	2.5	2.0	2.3	3.0
Minn. 1317	4.0	3.0	3.5	4.5	3.7	4.5	4.0	2.8	3.0	1.8	3.5
Minn. 4086	3.0	4.0	4.0	4.0	2.6	5.0	3.5	2.5	3.0	2.4	3.4
B5267-2	4.0	4.0	3.5	3.0		2.5	4.5	2.0	1.0	3.0	3.1
B6039-1	3.0	2.0	3.0	3.0		4.0	3.0	2.0	2.0	2.7	2.8
B6044-14	5.0	5.0	3.5	4.0		3.5	5.0	2.8	3.0	4.1	4.0
Wisc. 634	4.0	5.0	3.5	4.5	4.0	4.0	5.5	3.8	5.0	5.0	4.4
Wisc. 664	5.0	5.0	3.0	4.5	4.0	4.0	6.0	3.0	4.0	3.3	4.2
Neb. 99.56-4X	2.0	4.0	3.0	2.0	2.5	2.0	4.5	2.0		2.0	2.7
Neb. 92.56-4	3.0	3.0	3.5	2.5	2.5	5.0	4.0	2.5	3.0	2.0	3.1
Ia. 51-2	3.0	4.0	3.0	4.0	2.7	5.0	3.5	2.5	2.0	1.7	3.1
Mich. S709	3.0	3.0	3.0	4.5	3.2	4.0	5.5	4.0	4.0	3.2	3.7
Mich. S503	3.0	4.0	3.5	3.5	4.2	5.0	4.5	3.8	4.0	3.6	3.9
ND6993-13 Russ	3.0	3.0	3.0	3.0	2.6	2.0	5.0	2.8	2.0	1.9	2.8
ND5922-12	5.0	5.0	3.5	5.0	2.7	4.0	5.0	4.0	3.0	3.4	4.1
Red Pontiac	4.0	5.0	3.5	4.0	4.0	4.0	5.5	3.0	2.0	3.5	3.9

- 1/ 1 - Very early - Norland maturity.
 2 - Early - Irish Cobbler maturity.
 3 - Medium - Red Pontiac maturity.
 4 - Late - Katahdin maturity.
 5 - Very late - Kennebec or Russet Burbank maturity.

2/ No data reported.

North Central Table 4. Total Solids

Variety	Iowa	Kans.	Mich.	Minn.	Mo.	Fall	Late		N. Dak.	Ohio	S. Dak.	Wisc.	Ave.
						Crop	Crop	Nebr.					
<u>Early to Med. Early</u>													
Neb. 91.57-H18	15.0	18.5	17.7	21.8	20.6	19.4	17.8	19.9	15.4	18.7	16.9	18.3	
Ia. 22-111	13.5	17.3	16.7	20.9	18.8	17.5	16.5	18.4	14.8	17.4	15.6	17.0	
ND7196-18	14.3	19.6	18.6	22.7	21.9	19.1	18.4	20.1	15.6	18.8	18.6	18.9	
Norland	13.3	17.1	16.0	19.4	18.3	15.8	15.9	19.2	14.1		15.8	16.5	
Cobbler	16.2	20.1	18.2	21.8	21.2	19.4	17.6	20.9	15.6	17.7	18.4	18.8	
<u>Medium to Late</u>													
Minn. 174	17.1	20.1	18.8	24.2	21.6	21.2	17.8	22.0	16.0	16.6	18.2	19.4	
Minn. 1317	13.3	17.6	16.0	20.7	19.8	18.9	16.9	18.0	15.0	18.3	15.8	17.3	
Minn. 4086	13.9	18.9	17.3	23.3	20.4	19.1	17.1	20.5	15.6	16.7	17.7	18.2	
B5267-2	17.3	19.8	17.1	22.4		20.7	18.1	20.5	15.6	17.7	18.2	18.7	
B6039-1	17.3	19.1	18.0	23.3		18.8	20.2	22.0	15.6	21.0	18.2	19.4	
B6044-14	18.6	22.3	21.2	25.2		20.8	20.3	22.2	16.9	21.2	21.4	21.0	
Wisc. 634	15.8	18.7	19.0	23.1	21.2	20.0	18.0	20.7	15.2	19.6	19.0	19.1	
Wisc. 664	17.3	20.9	19.0	23.5	23.1	21.3	18.0	20.1	15.6	21.1	19.4	19.9	
Neb. 99.56-4x	15.2	18.5	17.1	21.6	20.1	19.3	18.5	19.7		17.7	17.1	18.5	
Neb. 92.56-4	15.4	20.2	17.3	21.4	21.9	20.4	18.4	20.3	15.4	18.5	17.7	18.8	
Ia. 51-2	15.0	19.4	19.2	23.3	20.2	19.6	17.6	20.5	15.8	17.8	18.4	18.8	
Mich. S709	15.2	17.8	17.7	22.2	21.2	18.0	17.2	19.0	14.1	18.8	16.5	18.0	
Mich. S503	17.1	21.2	17.5	25.0	23.0	21.1	19.5	20.1	15.6	21.0	19.7	20.1	
ND6993-13	15.2	18.4	18.8	20.9	20.3	21.6	18.3	21.6	16.5	18.7	19.7	19.1	
ND5922-12	14.8	18.7	17.7	22.9	19.9	19.7	17.4	19.9	16.2	18.5	18.0	18.5	
Red Pontiac	13.5	15.9	16.0	20.5	18.0	18.5	15.0	17.5	13.3	16.6	16.9	16.5	
Average	15.4	19.1	17.9	22.4	20.6	19.5	17.8	20.1	15.4	18.6	18.0		

North Central Table 5. Scab Reactions Reported.^{1/}

Variety	^{2/} Iowa	Kans.	Mich.	Minn.	^{2/} Mo.	Fall Crop. Nebr.	Late Summer Crop Nebr.	N. Dak.	Ohio	^{2/} S. Dak.	Wisc.
<u>Early to Med. Early</u>											
Neb. 91.57-H18	3-2	0-0	0-0	0-0		1-2	2-1	1-1	1-1		0-0
Ia. 22-111	3-1	0-0	0-0	0-0		1-1	2-5	2-2	1-2		0-0
ND7196-18	2-1	1-3	1-3	1-2		1-2	1-5	1-1	T-1		1-3
Norland	2-1	0-0	0-0	0-0		1-2	1-2	T-1	T-1		0-0
Cobbler	3-1	2-4	2-4	1-3		1-2	1-4	2-2	1-2		0-0
<u>Medium to Late</u>											
Minn. 174	2-1	2-4	2-4	1-3		1-2	1-2	1-1	T-1		0-0
Minn. 1317	3-1	2-4	2-4	0-0		4-3	2-2	T-1	T-1		0-0
Minn. 4086	2-1	0-0	0-0	0-0		1-2	1-4	2-2	1-3		0-0
B5267-2	3-1	1-4	1-4	1-3		1-2	1-4	1-1	T-1		0-0
B6039-1	3-1	0-0	0-0	0-0		1-2	1-4	1-1	1-1		0-0
B6044-14	4-1	1-3	1-3	0-0		1-1	2-5	1-1	1-1		0-0
Wisc. 634	4-2	0-0	0-0	0-0		2-3	2-5	1-1	T-1		0-0
Wisc. 664	3-1	0-0	0-0	0-0		3-2	2-4	1-1	T-1		0-0
Nebr. 99.56-4X	2-1	0-0	0-0	0-0		1-3	1-2	2-2			0-0
Nebr. 92.56-4	3-2	2-4	2-4	0-0		1-2	1-1	2-1	1-2		1-2
Ia. 51-2	3-1	2-3	2-3	2-4		1-2	1-5	2-2	T-2		0-0
Mich. S709	4-3	1-4	1-4	1-1		1-2	2-2	1-1	1-1		1-3
Mich. S503	3-1	0-0	0-0	0-0		1-2	1-1	2-1	1-1		0-0
ND6993-13 Russ	1-1	1-4	1-4	0-0		1-1	1-1	T-1	T-1		0-0
ND5922-12	1-1	0-0	0-0	0-0		1-3	1-2	2-1	T-2		0-0
Red Pontiac	4-1	3-4	3-4	2-4		1-4	2-4	2-2	T-1		0-0

^{1/} Area
T = less than 1%
1 = 1-20%
2 = 21-40%
3 = 41-60%
4 = 61-80%
5 = 81-100%

Type
1 = small, superficial
2 = larger, superficial
3 = larger, rough pustules
4 = larger pustules, shallow holes
5 = very large pustules, deep holes

^{2/} No scab reported.

North Central Table 6. Summary of Grade Defects.

Variety	External				Total ¹ / Free of Ext. Def.	Hollow Heart	Internal Necrosis	Internal		Total ¹ / Free of Int. Def.
	Scab	Growth Cracks	Second Growth	Sun Green				Vascular Discolor- ation		
<u>Early to Med. Early</u>										
Neb. 91.57-H18	25.6	1.9	2.2	2.5	75.6	0.6	2.5	10.2	87.0	
Ia. 22-111	17.8	6.8*	3.4	1.8	75.8	6.1*	1.1	13.6	77.5	
ND7196-18	25.3	0.2	1.7	2.7	78.1	0.7	1.9	12.8	83.8	
Norland	15.7	3.4	1.2	1.3	83.1	0.5	0.9	8.3	90.0	
Cobbler	22.0	3.8	6.6	5.1	71.4	6.1	4.3	17.6	72.8	
<u>Medium to Late</u>										
Minn. 174	30.6*	1.0	1.4	4.3	73.3	0.8	1.1	10.3	87.7	
Minn. 1317	31.6*	0.7	1.7	6.3	71.0	0.6	31.4*	8.5	86.6	
Minn. 4086	40.6*	3.6	2.5	2.4	63.5	0.5	0.4	6.1	92.4	
B5267-2	23.6	5.0	26.3*	3.4	60.7	3.7	1.3	5.2	88.8	
B6039-1	19.7	1.5	8.2	9.9*	66.6	0.8	0.6	5.2	92.6	
B6044-1	20.9	7.9*	8.5	7.1	63.9	15.5*	6.7	9.9	72.0	
Wisc. 634	21.4	2.2	2.7	4.5	75.8	1.9	2.5	6.8	88.3	
Wisc. 664	21.3	2.9	2.0	3.1	76.9	0.5	0.2	10.3	87.3	
Neb. 99.56-4x	30.8*	1.6	3.1	1.2	62.1	0.1	0.8	7.8	90.3	
Neb. 92.56-4	32.3*	2.4	5.6	1.3	68.9	3.4	1.2	7.0	87.9	
Ia. 51-2	32.4*	2.5	4.7	4.2	66.4	0.8	9.1	11.6	77.9	
Mich. S709	24.4	4.2	3.9	10.2*	65.6	1.2	2.0	8.9	87.9	
Mich. S503	16.9	1.0	3.2	9.2*	76.8	0.4	1.6	9.9	87.5	
ND6993-13 Russ	14.0	23.4*	16.5*	2.4	58.7	4.3	0.5	16.8	76.5	
ND5922-12	21.3	2.0	1.8	4.7	77.0	0.8	7.0	11.9	80.1	
Red Pontiac	29.7	3.1	5.4	1.3	68.5	1.4	1.7	17.7	78.2	

1/ Per cent normal tubers showing no defects (some individual tubers had more than one type of defect).

* Possible weakness of variety.

North Central Table 7. Merit Ratings

Variety	Iowa	Kans.	Mich.	Minn.	Mo.	Fall Crop Nebr.	Late Summer Crop Nebr.	N. Dak.	Ohio	S. Dak.	Wisc.	Total
<u>Early to Med. Early</u>												
Neb. 91.57-H18				5	2	2	2	5	3			5
Ia. 22-111												14
ND7196-18	3	2			5			2			5	17
Norland	5			3		4	5	4	2			23
Cobbler												0
<u>Medium to Late</u>												
Minn. 174		1		1	3				1		3	9
Minn. 1317												0
Minn. 4086				4		5		1			2	12
B5267-2			2									0
B6039-1			3									2
B6044-14			4									3
Wisc. 634	1						1		2	4	4	12
Wisc. 664	2	3									1	9
Neb. 99.56-4X	4				1		4					6
Neb. 92.56-4						1						5
Ia. 51-2												0
Mich. S709			5									5
Mich. S503				2	4		3	3	1			18
ND6993-13 Russ		5										0
ND5922-12		4	1			3			5	3		8
Red Pontiac												8

1/

Merit Points Determined as Follows:

Merit Points

Merit Rating

1	5
2	4
3	3
4	2
5	1

Irish Potato Variety Research Results, Alabama, 1970

J. L. Turner and Hubert Harris - Auburn University

Frank E. Garrett - Gulf Coast Substation

S. E. Gissendanner and John Eason - Sand Mountain Substation

Experimental Procedures. Thirteen named varieties and three numbered selections were grown in replicated trials this year at the Sand Mountain Substation, Crossville, Alabama. Plots were 50 feet long containing a total of 50 hills of potatoes. Seedpieces were 1-1/2 oz. in size and spaced 12 inches apart. Yields were determined by tuber sizes and samples of A size tubers brought to Auburn for specific gravity and chip color analysis. Specific gravity and chip color determinations were made within seven days of harvest. Storage during this time was at 68°F.

Results. Red La Soda was the highest yielding variety this year with 272 cwt. per acre of marketable potatoes. Other varieties that performed well are shown in Table 1. Sebago, Norgold, Sioux, and L. Seedling 51-2 were among the lower yielding varieties. Penobscot and W623 had the best chip color ratings and Penobscot had the highest total solids.

Table 1: Replicated Irish Potato Variety Trial, Sand Mountain Substation, Crossville, Alabama 1970 1/

Variety	Yield by grades cwt/acre			Sp. Gr. ^{2/}	Total ^{2/} solids	Chip ^{2/} color
	Size A	Size B	Total			
Kennebec	223	29	252	1.0918	22.8	8.2
La Chipper	174	36	210	1.0773	19.7	7.7
L. Seedling 51-2	123	33	156	1.0812	20.0	6.0
Norchief	167	58	225	1.0838	21.0	7.0
Norchip	196	27	223	1.0891	22.0	8.5
Norgold	122	36	158	1.0785	19.9	3.5
Penobscot	210	17	227	1.0999	24.4	9.0
Platte	165	42	207	1.0746	19.1	7.9
Red La Soda	241	31	272	1.0769	19.6	6.0
Sebago	129	32	161	1.0840	21.1	8.1
Shurchip	194	27	221	1.0802	20.3	6.9
Sioux	130	22	152	1.0902	22.5	4.0
Superior	192	16	208	1.0818	20.6	8.3
W623	198	27	225	1.0878	21.9	9.0
W560	185	23	208	1.0909	22.6	7.9
W664	217	30	247	1.0947	23.4	8.4

1/ Planted 3-16-70 - Harvested 7-10-70.

2/ Tests by Hubert Harris under project 9-705.

3/ Specific gravity was determined by the standard method.

4/ Chip color is based on a scale of 1 as very dark and unacceptable to 6 as barely acceptable to 10 as very light and highly acceptable.

ALASKA
Curtis H. Dearborn

Environment. Precipitation for the growing season, May through September at Matanuska, was very low, 6.31 inches. Soil moisture conditions were near the wilting point at planting and irrigation was practiced as necessary after planting. The mean maximum air temperature for May, June, July and August was 1 degree lower than the average for the previous 20 years and the mean minimum was 0.7 degrees lower than for the same period. Day length and total solar energy received was significantly lower than usual for June, July and August.

Maine-Beltsville potato clones of 3401 series. A single plot of 4 tuber-units of each clone listed on page 53 of March 1970 report Alaska table 2 was planted by machine 9 June 1970 11 inches between pieces and 36 inches between rows in the conventional manner using 8-32-16 fertilizer at 750 lb/A. All tops were badly damaged on 8 September by a hard freeze. All plots were harvested 21 September. Eighteen clones were retained on their merits as suitable in appearance for a commercial crop. Their productivity shown in Table I based on a single plot may be misleading but the percent of U.S. #1 tubers 2-3 1/2 inches in diameter, their specific gravity and weaknesses are real. Specific gravities of discarded clones ranged from 1.050 to 1.080. Considering all clones, the specific gravity of only 3.3 per cent exceeded 1.079 and none were above 1.086. Thirty one per cent exceeded 1.069 and 15 per cent were below 1.059. Kennebec as a standard was 1.083 and Alaska clone 1-62-90-64 was 1.100.

Maine-Beltsville potato clones of 2001 to 2360 series. A single plot 3 tuber-unit planting was made of 96 clones on 5 June following the procedures and practices as for the 3401 series above. The yields shown in table 2 of the 9 clones saved among the 96 may not be representative of these clones but other characteristics shown are meaningful. One clone of the 96 had a specific gravity exceeding 1.079 and only 13 per cent had specific gravities exceeding 1.069.

IR-1 Solanum species. Small whole tubers of 127 clones representing 29 species were planted in the field on 10 June. During the growing season each clone was noted for production of stolon plants. At harvest all clones were lifted and their stolons checked for development of tubers. Clones tested and their characteristics are listed in Alaska table 3. Species in test were originally obtained for evaluating their resistance to field frosting but the very low first frost of 8 September, 23°F followed on the 9th by 24°F was too harsh on vegetation for distinguishing levels of resistance. S. acaule was the only species that withstood the frosting and continued to flower.

Summary of Variety Yield Trials. Twenty five varieties and clones in 4 replicates were harvested early, 18 August, and 45 varieties and clones in 4 replicates were harvested late, 21 September.

In the early harvest trial, yields per acre and specific gravities for high yielding and high specific gravity clones were: Chieftain, 433 cwt, 1.076; Ak 11-65-3-67 red, 321 cwt, 1.083; Red Beauty 160 cwt, 1.082; Green Mountain, 353 cwt, 1.089; Kennebec, 266 cwt, 1.081; Bakeking 135 cwt, 1.082; Ak 1-62-90-64, 211 cwt, 1.101.

Top producers in the late harvest test were: Green Mountain 393 cwt, 1.087; Ak 4-58-3-66, 381 cwt, 1.091; Alaska Frostless 354 cwt, 1.089; Kennebec 348 cwt, 1.084; Ak 37-65-5-67 red, 353 cwt, 1.084; Ak 1-62-90-64, 273 cwt, 1.101; Bakeking 271 cwt, 1.088. Chieftain in this planting in a single plot produced at 315 cwt/A with a specific gravity of 1.079.

Alaska table 1. Productivity and tuber characteristics of the 1970 crop of Maine-Beltsville potato clones retained from series 3401-3578 grown in 1969 at Matanuska and listed in Alaska table 2. p. 53 March 1970 National Potato Breeding Report.

Code	Pedigree	Parentage	Total yield		Yield #1 CWT/A	No. #1 %	Sp. Gr.	Tuber Characteristics
			CWT/A					
3403	B6682-1	B3819-17 x B3692-4	189		166	88	1.078	Pink skin, shatter crack
3419	B6694-4	Chippewa x B5066-3	180		159	88	1.085	Buff skin, shatter crack
3424	B6698-10	B3720-Wy4 x B5141-6	254		193	76	1.075	White skin, growth crack
3429	B6703-2	B5052-7 x Cascade	58		49	84	---	Russet skin, wilted
3433	B6708-1	B5063-3 x Cascade	203		176	87	1.068	Buff skin, shatter crack
3439	B6712-23	B5287-16 x B5141-6	169		134	79	1.070	Buff skin, cylindrical
3467	B6750-3	B4557-2 x B5000-18	195		142	73	1.064	Buff skin, round
3474	B6751-14	B4557-2 x B5598-2	262		190	73	1.064	Buff skin, growth crack
3490	B6782-1	B5446-4 x B5089-17	236		131	56	1.066	Pink skin, growth crack
3493	B6799-5	B5716-5 x B5281-1	234		112	48	1.054	Russet skin, shatter crack
3505	BR6820-29	Wauseon x B3819-17	142		127	89	1.072	White skin, greening
3523	BR6863-4	Wauseon x B5141-6	147		89	61	1.070	Buff skin, shatter crack
3530	B6879-5	Wauseon x B5000-18	209		77	37	1.067	White skin, shatter crack
3549	BR6491-2	F5459 x B5141-6	225		144	64	1.070	Buff skin, shatter crack
3561	B6516-10	B3627-18 x B5141-6	101		84	83	1.083	White skin, scabby
3572	B6532-10	B3819-17 x B5141-6	110		63	57	1.083	White skin, shatter crack
3573	B6532-14	B3819-17 x B5141-6	100		17	17	1.086	White skin, shatter crack
3574	B6544-4	Wauseon x Cascade	203		144	71	1.070	Russet skin, shatter crack

Alaska table 2. Productivity and tuber characteristics of 9 potato clones retained from 96 of the Maine-Beltsville clones of the 2001 to 2360 series.

Code	Pedigree	Parentage	Total yield CWT/A	Yield #1 CWT/A	No. #1 %	Sp. Gr.	Tuber Characteristics
2010	B6928-10	Teton	189	154	81	1.075	Buff, greening
2048	B6930-6	B4808-8	202	178	88	1.069	White, scab
2062	B6930-20	B4808-8	165	119	72	1.064	White, scab
2072	B6930-30	B4808-8	162	143	88	1.056	White, large
2101	B6934-3	B725-61	74	55	74	---	Buff, small
2123	B6936-9	B5088-21	178	107	60	1.080	White, greening
2138	B6936-24	B5088-21	100	36	36	1.078	White, cracking
2293	B6966-8	DT5997-1R	176	135	77	1.066	Buff, small
2306	B6967-8	DT5997-1R x BT5043-2R	181	135	75	1.071	Pink, cracking

ALASKA TABLE 3
NOTES ON STOLON PLANT PRODUCTION AND TUBERIZATION OF CLONE OF
29 SOLANUM SPECIES OF POTATOES GROWN IN THE FIELD AT MATANUSKA IN 1970.

P.I. Number	Species of Potato	Clones that produced			
		Stolon Plants		Tubers	
		Yes	No	Yes	No
246504	S. acaule*	X			X
246571	" "	X			X
255501	" "	X			X
275124	" "	X			X
275125	" "	X			X
275126	" "	X			X
275127	" "	X			X
275128	" "	X			X
265860	S. boliviense	X			X
265861	" "	X			X
310928	" "	X			X
310974	" "	X			X
310975	" "	X			X
186548	S. cardiophyllum	X			X
186549	" "		X		X
275215	" "		X		X
279272	" "		X		X
283062	" "		X		X
275138	S. chacoense		X		X
275139	" "		X		X
320292	" "		X		X
320293	" "	X			X
320294	" "	X			X
WRF889	" "		X		X
WRF976	" "		X		X
338615	S. chancayense		X		X
275269	S. chiquidenum	X			X
310942	" "		X		X
310989	" "		X		X
243355	S. clarum		X		X
275202	" "		X		X
230558	S. demissum	X			X
230559	" "	X			X
338619	" "	X			X
347760	" "	X			X
347761	" "	X			X
347762	" "	X			X

continued

*Clones of this species were the only ones surviving the freeze of 8 and 9 September (23° and 24°F respectively).

255543	<i>S. fendleri</i>	X			X
275156	" "	X			X
275157	" "	X			X
275158	" "	X			X
265866	<i>S. gandarillasii</i>			X	X
283076	" "			X	X
265579	<i>S. gourlayi</i>	X			X
283090	" "	X			X
251063	<i>S. hjertingii</i>			X	X
251067	" "			X	X
265867	<i>S. infundibuliforme</i>	X			X
310976	" "			X	X
320296	<i>S. kurtzianum</i>			X	X
320297	" "			X	X
275273	<i>S. lignicaule</i>			X	X
310993	" "			X	X
210045	<i>S. medians</i>			X	X
310994	" "	X			X
320261	" "	X			X
210034	<i>S. megistacrolobum</i>	X			X
265578	" "	X			X
265874	" "	X			X
265879	" "	X			X
283082	" "	X			X
320316	<i>S. microdontum</i>	X			X
320317	" "	X			X
320318	" "	X			X
320319	" "	X			X
320320	" "			X	X
210042	<i>S. multidissectum</i>	X			X
210051	" "			X	X
210052	" "	X			X
230506	" "	X			X
266385	" "	X			X
275227	<i>S. papita</i>	X			X
275228	" "			X	X
275229	" "	X			X
283105	" "	X			X
320359	<i>S. phureja</i>			X	X
320360	" "			X	X
320363	" "			X	X
320364	" "			X	X
320366	" "			X	X
320367	" "			X	X
320368	" "			X	X
320369	" "			X	X
210049	<i>S. raphanifolium</i>	X			X
265878	" "	X			X
283086	" "	X			X
205397	<i>S. sanctae-rosae</i>	X			X
230464	" "	X			X
275152	" "	X			X
320323	" "	X			X
230510	<i>S. sogarandinum</i>			X	X
205526	<i>S. stenotomum</i>			X	X
205527	" "			X	X
230512	" "			X	X

Continued

Alaska Table 3 continued

230513	"	"		X	X	
234007	"	"	X		X	
234008	"	"		X	X	
234009	"	"		X	X	
234010	"	"		X	X	
283108	S.	stoloniferum	X			X
283109	"	"	X			X
338617	"	"	X			X
338621	"	"	X			X
338622	"	"	X			X
347771	"	"		X		X
347772	"	"	X			X
195210	S.	toralapanum	X			X
310936	"	"	X			X
186178	S.	Tuberosum		X		X
186179	"	"		X		X
186180	"	"		X		X
225627	"	"		X		X
225628	"	"		X	X	
225629	"	"		X	X	
338623	"	"		X	X	
347773	"	"		X	X	
230468	S.	vernei		X		X
230562	"	"	X			X
320329	"	"	X			X
320330	"	"	X			X
320332	"	"	X			X
320333	"	"		X		X

CALIFORNIA

R. E. Voss and J. C. Bishop

Eighteen varieties were grown at the Shafter Cotton Research Station in Kern County. Twelve of these varieties were grown at the Davis Campus in Yolo County. The seed for these varieties was grown the previous late summer and fall. It was 180 days from planting to planting. At harvest, total, No. 1, B's, and No. 2 and cull yields were measured. Specific gravity was measured. Scab ratings and other tuber disorders were recorded. All varieties were chipped and rated on a 1-10 scale.

Table 1 presents information from Shafter, and Table 2 presents the Davis data. Varieties which may have some potential in California, based on these experiments, include Cascade, Chieftan, Norchief, Norchip and B5267-2.

Table 1. Yield and Quality Measurements of Varieties Grown at
Shafter Cotton Research Station, Kern County

Variety	Yield, cwt			Ave. Tuber Wt., oz.	Specific Gravity	Chip Color ^{2/}	Scab Rating ^{3/}
	Total	No. 1 ^{1/}	Pct. No. 1				
B4787-1	315	280	89	7.4	1.058	9	0
B5090-1	230	205	89	5.6	1.061	5	2
B5267-2	270	250	92	4.8	1.075	5	2
Cascade	300	275	91	6.1	1.073	6	1
Chieftan	315	290	92	6.2	1.066	7	1
Kennebec	335	305	92	6.2	1.073	5	1
La Rouge	325	300	93	5.4	1.068	7	1
Monona	235	215	90	6.4	1.086	5	1
Norchief	340	320	94	6.2	1.069	6	1
Norchip	245	225	92	4.2	1.076	5	1
Norgold Russet	220	195	88	5.1	1.070	9	0
ND 7003	170	140	82	5.0	1.056	9	0
Red La Soda	365	340	93	5.9	1.072	7	2
Russet Burbank	260	200	77	4.3	1.074	6	1
Viking	245	230	93	6.2	1.070	6	1
Wauseon	325	295	90	5.6	1.072	5	1
White Rose	335	295	87	6.6	1.071	5	0
Wy Red	330	315	95	6.4	1.064	8	1
LSD(.05)	8	9			.004		

^{1/} Greater than 2" diameter

^{2/} Chip color based on NPCI scale (1 = excellent)

^{3/} Scab rating: 0-none, 1-some tubers, 2-nearly all tubers

Table 2. Yield and Quality Measurements of Varieties Grown at
Davis Campus, Yolo County

Variety	Yield, cwt			Ave. Tuber Wt., oz.	Specific Gravity	Chip Color ^{2/}	Scab Rating ^{3/}
	Total	No. 1 ^{1/}	Pct. No. 1				
B5267-2	450	380	84	8.8	1.077	5	0
Cascade	590	540	91	10.0	1.075	4	1
Chieftan	570	515	91	7.2	1.068	4	0
Kennebec	460	420	92	9.9	1.077	4	0
La Rouge	570	495	87	8.3	1.065	6	0
Norchief	590	535	91	8.2	1.072	5	0
Norchip	445	400	89	8.0	1.080	4	0
Norgold Russet	445	400	90	9.4	1.071	7	0
Red LaSoda	495	420	85	8.8	1.066	6	0
Russet Burbank	340	275	81	6.7	1.080	5	1
Viking	450	390	88	11.2	1.070	5	0-1
White Rose	410	375	91	8.6	1.070	7	0
LSD (.05)	12	13			.005		

^{1/} Greater than 2" diameter

^{2/} Chip color based on NPCI scale (1 = excellent)

^{3/} Scab rating: 0-none, 1-some tubers, 2-nearly all tubers

CANADA

G. R. Johnston and R. G. Rowberry

Ontario Regional Potato Variety and Adaptation Trials 1970

In 1970, the Ontario Regional potato trials were conducted at seven cooperating stations. Twelve cultivars were grown at most of the seven stations in randomized, replicated, single-row plots. Some stations included additional varieties in this trial. For comparison, there were included two standard cultivars at each station - Irish Cobbler and Kennebec. Tuber samples of each cultivar at each station were collected centrally and divided into two parts, one for processing into chips and french fries at the Food Processing Laboratory at the Smithfield C.D.A. Experimental Farm, and the other for specific gravity, boiling and baking tests at the Potato Quality Laboratory, Horticultural Science Department, University of Guelph. In addition, limited tests of the processing potential of advanced clones were carried out in cooperation with Hostess Food Products, Preston; and the Campbell Soup Company, Mississauga, Ontario.

Through the kind cooperation of Mr. David Clarke and Mr. Andrew Wood, Statistical Research Service, Research Branch, Canada Department of Agriculture, Ottawa, the yield and specific gravity data of the Ontario replicated potato trials were analysed statistically at the Data Processing Center, and the significance of the data was also prepared using the Duncan's multiple range test procedure. In the tables the .05 significance is indicated by letters, a, ab, bc, etc.

Nonreplicated potato adaptation trials were conducted as well at some of the cooperating stations. Some advanced, promising clones were grown in replicated adaptation trials at Ottawa, Preston, and Bradford (organic soil). These trials were in addition to the standard Regional Variety Trial. The nonreplicated adaptation trials were mainly in 10-hill plots but the Fredericton-bred, second field generation clones, as well as the Guelph-bred first field generation ones were grown as single-hill plots at Preston. A substantial proportion of the material under trial in Ontario originated from the National Potato Breeding program at the C.D.A. Station, Fredericton, N.B.

University of Guelph's Horticultural Research Station, Preston

Cooperators. G. R. Johnston and R. G. Rowberry

Soil. Fox sandy

Fertilization. The plot area was land-planed in the spring of 1970. Following planing 300 lb/acre of 8-16-16 was broadcast and cultivated in. At planting 900 lb/acre of 8-16-16 was banded. At early bloom stage 30 lb/acre of N was sidedressed.

Rotation. Potatoes following 1-year fallow plus oat cover crop (sown in early August).

Plant Protection. Weekly sprays of Thiodan plus polyram. Vine-killing was carried out the first week of September.

Weather and Irrigation. In general a moist, fairly cool growing season. Rainfall was heavy at times in July, August and September storms. Flooding became a problem in low spots in the plot area. The planing didn't overcome some "low" areas. It was discovered that plough-sole hard pan was present in the areas where the water remained between the rows, often for several days. Some plots were "drowned" out or partially so. Yield and quality were adversely affected. During the "drier" month of June, irrigation was used to supplement the rainfall, but again water remained between the rows in the low areas. The total rainfall for each month of the growing season was:

May - 2.70"; June - 2.24"; July - 4.7."; August - 4.33" and September - 3.81" which is a 5-month total of 17.79" or a weekly average of approximately 0.80".

Remarks. Harvesting had to be carried out between showers with water often standing between the rows. Yields and quality were down from 1969. Some plots in the 10-hill adaptation were a complete loss. In other cases it was most difficult to tell the "good" ones from the "poor" ones on tuber appearance and conformation. Often the lenticels were very enlarged with starch cells protruding and the tuber shape was abnormally "rough". Needless to say, the tuber decay in storage was at an all time high. Nevertheless, some of the results were rather interesting. The top yielders in the Ontario Regional trial of Preston were Abnaki (B5415-6), F6151 and F6117, all statistically ahead of Kennebec in the 2-1/4 - 3-1/2" category. All three had good to excellent boiling and baking scores, and none produced good chips or french fries. The top processors were F6119, Peconic, and Kennebec. It is unfortunate that neither F6119 or Peconic have been good yielders. Among the early sizing varieties of the Regional group the best two are B5282-13 and Gbr631-1. Both are rated superior to Irish Cobbler in the "early" class.

In the commercial chip trials conducted at Hostess Food Products Ltd., Preston, it was confirmed that from 55°F storage, F6119 and Peconic produced desirable light-colored chips consistently, with a somewhat better score than those of Kennebec. From the Hostess trials, also worthy of mention are the good results of Wauseon, F5748, B5236-8, B5282-13 and F6367.

The Smithfield results confirmed some good french fry prospects - F6364, Peconic, F5810, F6119 and B5282-13, but none were superior to Kennebec in this respect.

At Preston there were some promising new lines in the replicated adaptation stage, and seed of some of these has been multiplied to a limited extent. Among these are G6549-7, 4480-20, F6695, F67169, BR5948-1, B6097-9, F6520, DT6063-1R, F6592 and G6648-18p. G6549-7 is being increased as an early-sizing, high specific gravity, oblong-shaped clone with good potential for the french fry and mashed processing trade. It also makes light-colored chips from 55°F storage. Some tubers have been sent to B.C. to initiate a stock of virus-free seed. The present stock has a sprinkling of MM showing up in the greenhouse index.

Eligible for advancement from 10-hill adaptation to replicated adaptation at Preston are: Sioux, ND6967-6Ru, A6334-20, B6376-6, BR6290-3, 4611-20, 4611-23, 4647-41, G6457-5R, G6457-14R, G6620-1, G6620-18p, G6649-2R, G-6649-4R, G6659-6, G6659-7, G6666-2, G6666-4y, G677-1Ru, G678-3Ru and G6714-10R. Eligible for retrial in the replicated adaptation trial are: F67170, B6024-3Ru, G6446-2, G6026-7, G6523-12, 4511-19, 4461-11, F6345, F67169, BR5948-1, B6097-9, F6520 and G6448-5Ru.

From Fredericton, Preston received 1694 second-generation (field) seedlings representing most of their retentions from their 1969 single-hill nursery. Of these, 434 or approximately 25% were retained for replanting in 10-hill adaptation plots in 1971, at Preston. The percent retention is higher than normal but the "wet" season at Preston made selection by using horticultural characters somewhat difficult.

The Preston station very much appreciates the kindness of the Plant Introduction Station, Sturgeon Bay, Wisconsin, for supplying true seed of several Solanum species and interspecific hybrids.

KEY TO THE RATINGS USED IN ALL TABLES FOR VINE, TUBER AND CULINARY CHARACTERISTICS

Maturity (Vines)

- 1 - very early
- 2 - early
- 3 - medium
- 4 - late
- 5 - very late

Type

- 1 - round
- 2 - oval
- 3 - oblong
- 4 - long

Plant Vigor

- 1 - very weak
- 2 - weak
- 3 - moderate
- 4 - strong
- 5 - very strong

Appearance

- 1 - excellent
- 2 - good
- 3 - fair
- 4 - poor

Eye Depth

- 1 - shallow
- 2 - medium
- 3 - deep

Yielding Ability

- 1 - high
- 2 - medium
- 3 - low

Type of Scab

- 1 - small, superficial pustules
- 2 - larger, superficial
- 3 - large, rough or corky
- 4 - small, shallow pits
- 5 - large, deep pits

Culinary Ratings

Boiled

40
0

Texture

Very mealy
Very soggy

Baked

45
0

Color

30
0

Uniformly white, creamy or yellow
Overall darkening or severe stem-end
darkening

30
0

Flavor & Aroma

20
0

Pleasant, mild, natural
Unpleasant, strong, off-flavor

25
0

Sloughing

10
0

none
severe

not
rated

100

100

Ontario Table 1. Potato variety or seedling performance notes

Cooperator: G. R. Johnston

Location: Preston (Univ. of Guelph)

YEAR: 1970

PLANTED: April 28

HARVESTED: September 21

VARIETY OR SEEDLING	VINES					TUBERS		YIELD IN CWT. (per acre)			STAND (%)	CULINARY QUALITY					REMARKS
	MATURITY	VIGOR	TYPE	APPEARANCE	EYE - DEPTH	TOTAL	2 1/2" - 3 1/2"	Over 3 1/2"	SPECIFIC GRAVITY (1.0)								
									BOILED	BAKED		CHIPPED	FRENCH FRIED				
Abnaki	3 1/2	4	1	2	1	490	430 48* a	34	100	77 bc	96	95	60 ¹ 50 ²	100	100	100	Round, smooth, desirable size tubers with slightly flaked to very lightly netted skin. Trace of rhizoc. Moderate Silver scurf but doesn't show up appreciably because of skin type. Excellent boiling and baking quality.
F6151	4	4 1/2	1 & 2	2 1/2	2	496	384 43 a	41	100	76 bc	90	92	30 30	50	50	50	Bright-skinned, slightly irregular tubers. Very free of Si. sc. Sprinkling of rhizoc. sclerotia. High set. Medium-deep apical eyes. Excellent boiler and baker.
F6117	3 1/2	3 1/2	1	1	1	483	367 41 ab	48	100	68 ef	83	76	70 30	50	50	50	Round, very smooth and uniform tubers with slightly flaked to lightly netted skin type. Si. sc. if present is well masked. Light brown skin color. Trace of type 1 scab. Attractive tubers. Fair S.G. Good boiler; fair baker.

Outstanding characteristics plus a descriptive account of the presence of disease.

1 - directly from 55°F storage

2 - following 45° storage, conditioned 3 wks. at 70°

* - metric tons per hectare

Ontario Table 1. Continued

Cooperator: G. R. Johnston

Location: Preston (Univ. of Guelph)

YEAR: 1970

PLANTED: April 28

HARVESTED: September 21

VARIETY OR SEEDLING	VINES					YIELD IN CWT. (per acre)		STAND (%)		CULINARY QUALITY					REMARKS
	MATURITY	VIGOR	TYPE	APPEARANCE	EYES - DEPTH	TOTAL	2 ⁺ - 3 ⁺ "	Over 3 ⁺ "	SPECIFIC GRAVITY (1.0)	BOILED	BAKED	CHIPPED	FRENCH FRIED		
														1 - directly from 55°F storage 2 - following 45° storage, conditioned 3 wks. at 70° * - metric tons per hectare	

B 5282-13 3 3 2& 1 1 381 309 7 96 72 80 75 70 80 Well-sized, smooth, oval to oblong tubers with slightly flaked to very lightly netted skin. Some Si. sc. but skin type masks it well. Free of scab and rhizoc. Early sizing. Fair to good cooking quality. Good french fries from 45° plus conditioning. 66

F6119 3 3 1 3 1 388 299 54 100 92 85 98 70 70 Roundish, fairly smooth and uniform tubers with dark skin, finely netted. Although masked, considerable Si. sc. skin infection. Medium-deep apical eyes. High S.G. reading. Scab-free. Overall good to excellent culinary ratings.

B5236-8 3 3 1 2 1 354 298 34 90 65 77 71 40 40 Mostly round, smooth tubers with slightly flaked, light brown skin Rhizoc. pustules on some tubers. Fairly free of Si. sc. and scab. Somewhat low in S.G. Fair to poor culinary scores.

Outstanding characteristics plus a descriptive account of the presence of disease.

- 1 - directly from 55°F storage
- 2 - following 45° storage, conditioned 3 wks. at 70°

* - metric tons per hectare

Ontario Table 1. Continued

Cooperator: G. R. Johnston

Location: Preston (Univ. of Guelph)

YEAR: 1970

PLANTED: April 28

HARVESTED: September 21

VARIETY OR SEEDLING	VINES					TUBERS		YIELD IN CWT. (per acre)			CULINARY QUALITY					REMARKS
	MATURITY	VIGOR	TYPE	APPEARANCE	EYES - DEPTH	TOTAL	2 1/2" - 3 1/2"	Over 3 1/2"	STAND (%)	SPECIFIC GRAVITY (1.0)	BOILED	BAKED	CHIPPED	FRENCH FRIED		
Irish Cobbler	2	3	1	4	3	292	236	27	100	74	85	88	60	70	Typical Cobblers - irregular, deep-eyed. Moderate Silver scurf. 10/2 scab. No rhizoc. sclerotia on tubers. OK as a boiler and baker except for deep eyes and rough shape.	
							26			cd			40	60		
4407-1	4	3	1&2	2	1	299	224	61	60	76	94	91	30	60	Round to oval, fairly uniform and smooth tubers with slightly flaked skin. 5/1 & 2 scab mostly at lenticels. Occasionally tuber with patches of Si. sc. Quite susceptible to MM virus infection in field. Excellent boiler and baker.	
			2				25			bc			40	70		
F6367	2 1/2	3	3	3	1	248	199	41	52	72	89	90	70	70	Oblong, slightly irregular tubers with slightly flaked to lightly netted skin. Considerably Si. sc. Quite susceptible in field to MM virus infection. Only fair S.G. readings. Good to excellent boiler and baker.	
							22			d			50	40		
							f									

Ontario Table 2. The tuber sizing and specific gravity readings of advanced potato cultivars, harvested at two dates at Preston, Ontario, in 1970.

- A. Mean number of tubers per hill, 1-7/8 inches and over.
 B. Mean yield of tubers, 1-7/8 inches and over, in cwt. per acre.
 C. Mean specific gravity readings.

Variety	Vine Maturity	Harvest Dates		Remarks
		July 22	August 25	
Onaway	E 2	A. 4.0	5.4	Early check variety.
		B. 188	358	
		C. 1.063	1.069	
F67170 (4647-8)	VE 1	A. 4.4	5.6	Retrial in Replic. Adapt. Round, clean, tough- skinned, medium-sized.
		B. 159	337	
		C. 1.070	1.076	
B6024-3Ru	VE 1	A. 3.6	6.1	Retrial - Replic. Adapt. Oval-oblong, smooth. Ex. net. 225 lb. of seed potatoes.
		B. 105	337	
		C. 1.071	1.064	
G6446-2	E 2	A. 5.1	6.6	Retrial - Replic. Adapt. Smooth, clean, tough- skinned. 150 lb. of seed.
		B. 155	317	
		C. 1.070	1.078	
G6026-7	E 2	A. 1.5	5.1	Flooding ruined parts of plot area. Clean, bright skin. Res. to Rhizoc. Good yield at Bradford. Retrial?
		B. 46	268	
		C. 1.064	1.079	
G6523-12	E 2	A. 2.7	5.5	Med. sized, clean, round. Light colored chips from 55°F in both 1969 and 1970. Retrial.
		B. 115	303	
		C. 1.074	1.080	
F6595	ME 2½	A. 3.3	5.1	Oblong, well-sized by mid- Aug. May be very susc. to mosaic-type virus.
		B. 145	372	
		C. 1.065	1.073	
4511-19	ME 2½	A. 3.9	6.3	Oblong, clean, smooth tubers. Retrial if seed available from Fredericton.
		B. 117	377	
		C. 1.069	1.078	

Ontario Table 2. Continued

A. Mean number of tubers per hill, 1-7/8 inches and over

B. Mean yield of tubers, 1-7/8 inches and over, in cwt. per acre.

C. Mean specific gravity readings.

Variety	Vine Maturity	Harvest Dates		Remarks
		July 22	August 25	
4461-11	ME 2 $\frac{1}{2}$	A. 3.4	4.7	Round, clean, well-sized. Retrial. Only 30 lb. of seed.
		B. 137	346	
		C. 1.065	1.075	
G6563-5	ME 2 $\frac{1}{2}$	A. 3.2	5.3	Round, well-sized, tough- skinned. Retrial? Only 50 lb. of seed.
		B. 138	291	
		C. 1.072	1.077	
G6443-35	ME 2 $\frac{1}{2}$	A. ---	6.0	Parts of all reps flooded. Only harvest at one date - Aug. 25. Very limited supply of seed. Retrial?
		B. ---	426	
		C. -----	1.073	
4480-20	M 3	A. 4.6	5.3	Very round, clean, lightly netted tubers. Advance to Ont. Reg. Tr. if seed available. Have 225 lb. at Preston. Need some from N.B.
		B. 173	349	
		C. 1.061	1.071	
F6695 (4435-25)	M 3	A. 4.1	6.3	Very smooth, clean tubers with sl. netted, creamy skin. Have 225 lb. seed at Preston. Eligible for Ont. Reg. Tr. if enough seed from N.B.
		B. 139	342	
		C. 1.062	1.073	
F6345	M 3	A. 3.5	4.9	Oblong, well-sized. French fry type with good S.G. Retrial.
		B. 134	363	
		C. 1.077	1.085	
F67169 (4647-4)	M 3	A. 3.4	5.0	Round, smooth, clean. Chips score mediocre - dark cambiums. Retrial. 200 lb. of seed at Preston.
		B. 109	306	
		C. 1.070	1.083	
BR948-1	M 3	A. 3.4	5.6	Oblong, clean, smooth. Multiple disease resistant. Rates high at Campbell's for French fries and mashed. 190 lb. of seed. Retrial.
		B. 116	325	
		C. 1.080	1.085	

Ontario Table 2. Continued

A. Mean number of tubers per hill, 1-7/8 inches and over.

B. Mean yield of tubers, 1-7/8 inches and over, in cwt. per acre.

C. Mean specific gravity readings.

Variety	Vine Maturity	Harvest Dates		Remarks
		July 22	August 25	
B6097-9	M 3	A. 2.4 B. 74 C. 1.063	5.3 365 1.082	Oval to oblong, smooth, well-sized. French fry shape and size. Preston has 250 lb. of seed. Retrial. Made good chips.
F6520	ML 3½	A. 3.6 B. 122 C. 1.058	4.1 339 1.077	Oval to oblong. French fry shape and size. Sl. netted. Clean. Retrial. Preston has 75 lb. seed. Good chipper.
G6448-5Ru	ML 3½	A. 2.5 B. 97 C. 1.060	5.5 388 1.072	Smooth, netted, oblong type. Chips too dark. OK as boiler. Retrial. 45 lb. of seed.
DT6063-1R	ML 3½	A. 3.4 B. 125 C. 1.064	4.8 363 1.075	Round, well-sized, red-skinned. Very good chipper - 80 rating. Ont. Reg. Tr. in 1971.
F6592 (4402-4)	L 4	A. 3.5 B. 191 C. 1.066	4.9 337 1.086	Oval to oblong. French fry shape and size. Lightly netted. Retrial. Ont. Reg. Tr. if N.B. has enough seed. Preston has 70 lb.
WC230-14Ru	L 4	A. 2.6 B. 81 C. 1.062	4.4 323 1.067	Oblong, smooth, netted type. Only fair yield and S.G. Attractive netting. Dark chips. Retrial?
Kennebec	ML 3½	A. 3.6 B. 149 C. 1.060	5.4 421 1.078	Large, fairly smooth tubers. Large size accounts partly for high yield. Maincrop standard. Very good chips
Variety Means		A. 3.4 B. 128 C. 1.067	5.4 346 1.076	

Ontario Table 3. Commercial chip color tests on potato clones from replicated trials grown at the Preston and Bradford stations in 1970, conducted at five dates by Hostess Food Products limited, Preston, Ontario.

Clones	S.G. (1.0)	Chip color ratings				
		Nov. 16	Dec. 4	Dec. 17	Jan. 5	Jan. 26
<u>AT PRESTON</u> (mineral soil)						
Irish Cobbler	69	70*	80	70	75	60
Gbr631-1	66	65	65	60	75	50
F6367	74	75	75	70	70	75
B5236-8	65	70	75	80	70	80
B5282-13	72	80	80	70	65	70
F6119	95	75	75	85	75	75
F6117	63	60	30	45	60	55
F6151	79	45	50	30	50	50
4407-1	74	50	70	30	30	40
Abnaki	77	78	70	65	65	70
Peconic	82	80	90	90	85	90
Kennebec	73	75	80	75	-	80
Wauseon	80	75	75	75	80	75
Chieftain	68	45	65	50	60	60
B5236-21	64	60	80	75	70	55
F5748	80	70	65	75	80	75
F6364	85	65	70	60	60	60
F5810	87	70	75	70	80	65
<u>AT BRADFORD</u> (organic soil)						
Kennebec	70	50	70	45	50	55
Peconic	76	60	68	75	75	75
4407-1	71	45	50	50	40	40
F6367	70	70	75	65	45	70
F6119	92	75	78	80	70	75
G6546-6p	87	80	85	75	85	75
G6551-7y	83	70	65	65	75	85
G6648-18p	69	75	80	80	80	80
F5647	66	60	50	60	80	75

*Rating of: 85 or over is Excellent; 75-84 is Good; 65-74 is Fair;
60-64 is Borderline.

Note: Chipped directly from 55°F storage.

DISCUSSION OF POTATO CULTIVARS THAT WERE IN ADVANCED
TRIAL IN ONTARIO IN 1970 AND WHICH MAY
MERIT FURTHER TRIAL OR TEMPORARY
LICENSING IN 1971

F6151 2nd year in Interregional trial (IRT) and 1st year in Ontario Regional Potato Variety Trial. Fredericton-bred and selected. Vines are generally vigorous and late in maturity. Its resistance to Verticillium wilt has not been established but wilt symptoms were not noted on the vines. Using Fredericton-grown seed, there have been no foliar virus problems. The tubers size somewhat late, are clean and bright, irregular in shape with medium-deep apical eyes and smooth skin. Most locations reported freedom from common scab and silver scurf; occasionally some Rhizoctonia sclerotia (black scurf). The top yielder in the Ontario trials in 1970. Average in specific gravity. Good boiling and baking scores generally. Poor ratings for chips and french fries. High yielding in the IRT at La Pocatiere, Quebec. Since its only potential is in the main crop table stock trade its future may be questionable. Retrial in the IRT and the Ontario Regional Potato Variety Trial (ORPVT) in 1971?

Abnaki (B5415-6) 1st year in both the IRT and the ORPVT. Originated from U.S.D.A. at Beltsville, Maryland. Vines are very vigorous and mature medium-early to medium-late depending on location. Tubers size medium-late in season. The set is high and size is mostly medium. In general the tubers are roundish, smooth, uniform, attractive with shallow eyes and the skin type varies from smooth to slightly flaked to lightly netted depending on the location. The skin color is ivory to light tan. Some stations reported some silver scurf and/or Rhizoc. on the tuber surfaces. Generally relatively free of scab. Very resistant to the races of Verticillium wilt prevalent in Ontario. The yielding ability is equal to Kennebec and the tuber size and appearance for the table stock trade is more desirable. Medium-high specific gravity (same as Kennebec). Good to excellent boiling and baking quality. Unsuitable for chipping or french frying according to the Smithfield scores. Abnaki's potential is for the main crop table stock trade with earlier maturity than Sebago and Verticillium wilt resistance. Requires further testing regionally in 1971.

Peconic 3rd year in the ORPVT and 1st year in IRT. Originated from the potato breeding program of Cornell University, N.Y. Vines are moderately vigorous and mature medium-early to late depending on location. Plants are rather susceptible to leaf roll virus and physiological rolling of the leaves is quite pronounced as senescence sets in. Tubers size medium-late. Lack of tuber sizing can be a problem where soil moisture or fertility conditions are only fair. The tubers are roundish, clean-skinned and generally smooth, although the apical eyes may be medium-deep. The skin type varies from smooth to flaked and in color from light cream to light tan. Stations report varying amounts of silver scurf and Rhizoc. and traces of common scab. The Verticillium wilt resistance is not established but Peconic is reported by New York State to be resistant to golden nematodes. The specific gravity is medium-high but the yields in 1970 were only fair. The culinary quality is good to excellent in almost every category. Peconic's future depends on whether the yields can be sufficiently improved by management or cultural techniques. A temporary licence as yet is hardly justified.

F6119 1st year in ORPVT but was in IRT in 1969. Fredericton-bred and selected. Moderately vigorous vines that mature medium-late. No problems with foliar virus using Fredericton-grown seed. Resistance to Verticillium wilt in Ontario not established but wilt symptoms not reported by cooperators. Only a fair set of tubers that size medium-late. Tubers are round to oblong, fairly smooth and uniform with medium-deep apical eyes and a skin type that varies from flaked to netted. The skin color varies from tan to grayish-brown. Some stations reported as much as 4% of type 1 and 2 common scab. Although it is somewhat masked by the skin type, silver scurf was moderate to severe at some locations. Some Rhizoctonia sclerotia was reported. Although the specific gravity is the highest for any variety in the trial, the yield is generally well below that of Kennebec. F6119 has the best overall culinary record of any variety in the trial. Boiled, it often sloughs. It is very mealy, baked. The french fry ratings are good to excellent and it makes light, uniform chips from 55°F storage. F6119's future? A higher yield is probably required to make it commercially acceptable to growers. Allocate it to production trials in 1971? Support a temporary licence if other region(s) propose it?

4407-1 1st year in ORPVT and also in IRT. Bred in Fredericton. Reselected at Preston from 1-hill Fredericton 2nd generation clones. The seed has been increased mainly at Preston. But it was in 10-hill adaptation trial on organic soil at Bradford that 4407-1 came into prominence in Ontario trials. Vines are mostly moderately vigorous (weak at Williamstown) and mature medium to late at all stations except Thunder Bay, where they mature early. Tubers tend to size early. Under Ontario conditions 4407-1 seems to be very susceptible to picking up leaf roll and mosaic type viruses, even with a regular spray program. The tubers of 4407-1 are roundish, fairly smooth and uniform generally, can get oversized and somewhat rough, have skin type varying from smooth to slightly netted and color from white to light brown. The apical eyes are sometimes medium deep. The specific gravity is medium and the yield is generally better than Cobbler. Although originally being increased for further testing mainly on organic soil, 4407-1 has shown much promise as an early at Thunder Bay. The boiling and baking quality was very good to excellent from all 7 locations. It is not suitable for processing into chips or french fries. Its future may hinge on its performance in subsequent trials in Northwestern Ontario. Retrial in ORPVT in 1971?

B5282-13 1st year in ORPVT. Originated from U.S.D.A., Beltsville, Maryland. Vines are usually moderately vigorous and mature early to midseason depending on location. Tubers size early. Plants are somewhat susceptible to leaf roll virus infection. Tubers are generally well-sized, oval to oblong, smooth in conformation with shallow eyes. The skin varies from smooth to flaked to lightly netted and the color from ivory to light tan. The tuber set is medium and oversizing can be a problem. Growth cracks were reported from 3 locations. It is apparently quite susceptible to silver scurf. Some superficial scab was reported at some locations. 10% internal brown spot in the tubers was noted at Simcoe. B5282-13 compares with Cobbler in yield and specific gravity. The boiling quality of B5282-13 was good to excellent at all locations. If B5282-13 has any future in Ontario, it would seem that it would be as a variety for early harvest in the "new" potato deal. Retrial in 1971 in the ORPVT?

B5236-8 1st year in ORPVT. Originated from U.S.D.A., Beltsville, Maryland. Vines mature medium-early to midseason and are moderately vigorous. Some virus was present, mostly leaf roll. The tubers size early. At Preston the tubers of B5236-8 are the earliest sizing of any clone in advanced trial. The tubers are round to oblong, of fairly good conformation with shallow eyes and slightly flaked to very lightly netted bright skin. Some growth cracks occurred at some locations. At Simcoe, 20% Silver scurf and some internal necrotic brown spots in the vascular tissue were noted. A little superficial scab was sometimes present. It is a good yielder in the medium-early class, but the specific gravity is somewhat low at some locations. Yet B5236-8 has the ability to produce attractive-looking chips and french fries from some locations. It is not suitable as a baker. It has acceptable boiling quality but lacks mealiness. The future of B5236-8 is for early harvesting for the table stock trade and also perhaps for summer processing. Retrail in the ORPVT is 1971?

COLORADO
James A. Twomey

Seedling Program. Approximately 30,000 first-year seedlings were grown in 1970. These were supplied by Dr. Raymon E. Webb, Beltsville, Maryland, and Dr. William G. Hoyman, Prosser, Washington.

Seedlings were planted the first two weeks in May and were harvested the first week in September. A total of 469 seedlings were selected for subsequent testing. From 446 seedlings selected in 1969, forty-one advanced seedlings were tested in 1970; of these, thirteen Russet Burbank types and seven round white selections were saved for further testing.

B5141-6 continues to be the most reliable selection for chip color. B5141-6, Norchip, Pennchip, Jewel & Oromonte were the only selections that performed well in all chip tests this year. Oromonte and Jewel were outstanding considering that they were harvested nearly a month later than the other selections and after extremely cold temperatures. The results of the chip trials are in Table 1.

Yield Trial. Thirteen varieties and advanced seedlings were included in the 1970 yield trial. Selections were planted in two 36-inch rows, 30 feet long and replicated 6 times. Spacing in the row was 12 inches.

Fertilizer (16-20-0) was applied at the rate of 350 lbs. per acre, three inches below the seedpiece at planting. Yields were comparable to the 1969 trial, but the amount of B size and culls increased in 1970. These data may be found in Table 2.

Pennchip yielded the most No. 1 tubers and performed well in the chipping tests. This variety appears to be adaptable as a chipper for our area.

WC230-14, a Russet seedling, is another promising selection. Tubers are smooth with shallow eyes and resemble Norgold. However, yield has been larger and generally it does not produce as many round tubers as Norgold. This seedling will be increased in the Colorado Seed Program in 1971.

6CX6 has performed well in both yield and chipping tests.

Norchip and Oromonte, although not yielding as well as Kennebec this year, are two of the better performers in chipping tests.

DT6063-1R, a smooth, shallow-eyed red selection, continues to perform well. Tests in 1969 indicate this selection may perform well in California. DT6063-1R is presently being increased by the Colorado Certified Potato Growers.

Colorado Table 1. Chip color^{1/} and specific gravity^{2/} of advanced seedlings.

Clone	Specific Gravity	Harvest Color	3Wk's 70° Color	10Wk's 40°		10Wk's 50°	
				1Wk 70° Color	3Wk's 70° Color	1Wk 70° Color	3Wk's 70° Color
BC7010-2	1.079	31.0	27.0	12.5	9.0	15.0	16.0
BC7028-3	1.072	38.5	37.0	11.0	11.0	22.0	21.0
BC7021-1	1.081	39.0	30.0	28.0	22.0	31.5	32.0
BC6785-1	1.084	48.5	34.0	11.0	12.0	21.0	23.0
Minn.-148	1.068	36.0	23.5	17.5	17.0	25.0	31.5
Cascade	1.079	30.5	23.0	12.5	9.5	17.0	22.0
BT5215-2	1.084	37.5	29.0	20.0	21.0	21.0	27.0
Norchip	1.089	43.0	40.0	20.0	29.5	25.0	22.0
B5141-6	1.101	40.0	40.0	30.0	24.0	34.5	40.0
BT5404-2	1.085	35.0	35.0	17.0	17.5	30.0	26.0
Pennchip	1.077	36.5	33.0	24.0	25.5	36.0	33.0
Kennebec	1.080	28.5	28.0	14.0	18.0	22.0	21.5
Wauseon	1.081	32.0	33.0	11.0	20.0	26.0	29.0
Oromonte	1.085	32.0	33.0	27.0	29.0	26.5	35.0
Jewel	1.094	36.0	37.5	20.0	25.0	26.0	27.5

^{1/} Chip color determined with Photovolt reflectance meter. Color readings of 25 or above acceptable.

^{2/} Specific gravity determined by potato hydrometer.

Colorado Table 2. Total yield & grade for variety trial.

	Yield Per Acre						Total U.S. No. 1	U. S. No. 1
	U. S. No. 1 2-3"	U. S. No. 1 > 3"	U.S. No. 2	Culls	B size < 2"	Total		
	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Cwt.	Pct.
Red McClure*	212.7	10.9	57.3	24.9	157.3	463.5	223.7	47.9
Pennchip	243.2	50.8	20.3	5.2	89.9	411.2	295.7	71.9
R. Burbank	156.3	48.4	65.0	23.0	102.6	391.2	204.8	71.8
Kennebec	151.5	93.6	57.1	23.5	53.2	379.3	245.2	84.6
6CX6	180.0	78.6	28.1	9.9	67.0	364.0	258.8	71.1
WC230-14	196.0	48.6	13.3	2.4	71.9	333.8	246.1	73.8
65-49-10*	151.7	29.2	25.1	8.2	119.1	333.3	180.9	54.2
BT5215-2	174.7	79.8	10.1	5.6	56.2	326.8	255.4	77.9
Wauseon	153.2	9.6	4.8	3.6	149.6	321.6	162.6	51.0
DT6063-1R*	174.9	38.7	11.3	1.8	89.8	317.2	213.9	67.3
66-129-6*	103.9	120.2	39.9	16.6	34.4	315.0	224.0	71.2
Norchip	165.7	9.7	26.6	3.0	103.7	309.5	174.8	56.5
Oromonte	164.5	25.5	17.4	4.1	112.3	307.2	173.5	56.4
LSD .05	26.6	18.2	10.6	8.2	16.7	34.2	32.7	14.3
.01	35.5	24.2	14.1	10.9	22.3	45.5	43.5	19.1

*Red Selection

DELAWARE

Eugene P. Brasher, Donald J. Fieldhouse and Myron Sasser

Twenty seedlings and four named varieties and strains were tested in 1970. The experimental conditions and procedures were as follows: Soil, Norfolk sand loam; planting date, 4/10/70; plot design, randomized block; replications, four; plot size, 3 by 24 feet; spacing in row, eight inches; fertilizer, 1500 lbs/A of 10-10-10 in bands at planting time; irrigation, as needed to maintain soil moisture above 50% available; fungicide, maneb; insecticide, Sevin; harvest date, 8/4/70. The results are shown in the following table.

Delaware Table 1. Yield, specific gravity and ozone injury tests, Delaware Agricultural Substation, Georgetown, Delaware, 1970.

Seedlings & Varieties	Yield per Acre Over 1-7/8"		Specific Gravity ^{1/}	Ozone Injury ^{2/}
	CWT	Pct.		
B 6887-6	302	89	56	7.0
BR6820-29	280	93	68	2.0
B 6879-5 _{3/}	274	90	67	8.3
Superior ^{3/}	273	94	70	1.0
BR6822-5	271	95	71	2.5
BR6820-26	271	88	60	8.8
B 6751-13	271	87	65	6.5
B 6138-3	266	89	79	3.0
Superior	266	93	70	1.3
B 6743-3	256	88	57	2.0
B 6741-23	254	86	72	6.3
BR6863-2	254	93	75	3.0
Katahdin	252	92	61	7.0
B 6750-3	227	84	54	3.0
BR6862-2	221	96	64	6.0
B 6741-2	216	84	74	6.3
BR6820-15	203	87	55	8.8
B 6741-22	203	84	66	5.3
B 6750-11	200	71	70	5.5
B 6879-11	197	80	59	9.0
BR6863-3	197	91	62	6.3
Haig	188	79	58	9.5
B 6799-1	158	76	55	9.8
B 6731-3	139	64	65	2.0
L.S.D - 5%	45	-	03	1.0

^{1/} 1.0 Omitted

^{2/} 1 = trace, 10 = very severe injury

^{3/} Commercial seed source, all other seed from USDA

Of the above seedlings and varieties, B 6887-6 was the most productive while B 6138-3 (purple tubers) had the highest specific gravity. Superior was the most resistant to injury when the atmosphere on June 11 to 13 contained as much as 15 parts of ozone per 100,000,000.

DELAWARE

R. F. Stevens, F. Webb & R. G. Ginder

Fourteen varieties of white potatoes were planted on the farm of J. F. Tarburton of Dover, Delaware, in 36" rows with seedpieces 8-9" apart. Two hundred lbs. of seed were planted of most of the varieties. All varieties were planted 5/1/70, which is much later than normal (two to four weeks) for this area. Fertilization consisted of 160 lbs. of N, 200 lbs. of P_2O_5 and 200 lbs. of K_2O partly plowed down and part in the planter. The soil type was Matapeake silt loam. The standard weed control and pest control practices were used. All plots were irrigated as needed until late July. Late maturing varieties did not receive the late irrigation needed for best yields.

Six sample harvests were made at weekly intervals to determine maturity dates. Data was also collected on yields, specific gravity and chip color.

The following varieties were judged best from the standpoint of the above observations: Superior, LaChipper, Norchip and Shurchip.

Delaware Table 1. Yield, Specific Gravity and Chip Color of Various Varieties

Variety	Total Yield cwt./acre	SP. Gravity 7/21/70	SP. Gravity 8/24/70	Chip Color*	
				Average of Chips Made 7/21-7/28 8/5	Average of Chips Made 8/17-8/21 8/24-8/28 9/3-9/9
1. Raritan	234		1.088		3.7
2. Kennebec	292	1.058	1.076	4.0	2.7
3. Superior	325	1.060	1.077	5.0	1.3
4. LaChipper	352	1.052	1.074	4.3	1.0
5. Katahdin	256		1.079		2.5
6. Shurchip	350	1.059	1.070	5.3	1.8
7. Abnaki	262	1.048	1.076	11.0	2.8
8. Platte	262	1.060	1.061	5.7	3.3
9. Norchip	291	1.061	1.078	3.0	1.7
10. Alamo	320	1.060	1.061	9.0	3.0
11. Haig	278	1.060	1.071	4.0	1.7
12. Seminole	249	1.058	1.085	4.3	2.2

*Determinations made by Wise Potato Chip Company
1-4 acceptable; 5 borderline; 6-14 not acceptable

ICELAND (Reykjavik and Eyrarbakki)
(Einar I. Siggeirsson, Stangarholt 30)

Thirteen seedlings and six varieties were grown in nematode-infested soil at Eyrarbakki, Southern Iceland, for comparison with the commonly grown variety Gullauga.

Thirteen seedlings and 6 varieties were grown in clean soil in Reykjavik.

The growing season temperatures (June-September) were around normal. May and June were dry, but the period July through September had adequate supply of moisture. Most of the harvesting was completed before killing frost occurred. The yields were all above average. The seedlings and varieties were planted in 6-row plots (3 x 12 feet) with an 18-inch seed spacing.

The following fertilizer was applied per acre: ammonium nitrate, 112 pounds; superphosphate, 80 pounds; K_2O , 82 pounds; and sulfur 10 pounds. The sulfur was used to decrease common scab.

Yields are given in Iceland Table 1. The seedlings differ in their resistance to the golden nematode. B4494-15 and B1558-1 are promising for future growing in Iceland as is ND4122-2, but the latter is susceptible to late blight. They are early maturing and have good flavor and cooking quality as potatoes are cooked in Iceland. The Wauseon and Alamo yielded well both in clean and infested soil. They have good flavor and cooking quality and will be increased in the future. B4557-2 matures late but showed high foliage resistance to frost under Iceland's conditions. This clone is now being used in frost-resistant crosses.

Iceland Table 1. Potato varieties and seedlings tested in Iceland 1970 for golden nematode resistance.

Variety or Seedling	Yield Per Acre		Resistance to golden nematode		
	Nematode (Infested) Soil	Clear Soil	Type		
	(Sandy Loam) Total	(Muck) Total	A	B	A x B
	<u>cwt</u>	<u>cwt</u>			
ND 4122-2	80	86	Good	Good	Med.
B 4557-2	82	79	Ex.	Ex.	Ex.
B 4537-8	81	75	Poor	Med.	Good
B 4296-9	78	63	Good	Med.	Poor
B 4494-15	74	68	Good	Med.	Poor
B 1558-1	70	64	Poor	Med.	Med.
B 4824-1	50	62	Good	Good	Med.
B 4824-7	52	65	Good	Good	Med.
B 4839-2	61	66	Poor	Poor	Poor
B 4159-2	32	36	Poor	Poor	Poor
B 4151-2	24	29	Poor	Poor	Poor
B 4151-2	21	26	Poor	Poor	Poor
Gullanga	20	79	Poor	Poor	Poor
Antinema	50	56	Ex.	Poor	Good
Antinema x					
B 4557-2	54	59	Ex.	Ex.	Ex.
B 5281-1	61	70	Good	Med.	?
B 5288-5	59	62	Ex.	Med.	Med.
B 5132-3	60	68	Good	Good	Good
Lenape	70	81	Med.	Med.	Med.
Wauseon	81	89	Ex.	Ex.	Ex.
Alamo	80	87	Ex.	Ex.	Med.
Nooderling	55	69	Ex.	Good	Ex.

Maine - 1970

Hugh J. Murphy and Michael J. Goven

Cooperative variety trials with 31 entries each were conducted during 1970, at Presque Isle, Washburn, and Corinna, Maine. Weather and soil conditions delayed planting, but fortunately killing frosts were well into October allowing for a long growing season. Early maturing varieties set on tubers when weather was hot and soil conditions extremely dry. Consequently, as noted in Maine Tables 1 and 2, yields were relatively low because of a light set and small tuber sizes. Medium and late-maturing varieties had more favorable conditions for set and sizing up.

Plots at all test locations were single rows, 25 feet long, and replicated six times. Planting, killing and harvest dates, seedpiece spacing, and fertilizer used at each location are presented in Maine Table 5.

Yields and specific gravities for the varieties grown at all Maine locations are presented in Maine Table 1. BR6312-2, BR6246-2, BR6316-4, BR5960-13 and BR6315-5 were among the top yielding seedlings; whereas Kennebec, Katahdin, and Oromonte were top yielders for named varieties. The five high varieties in specific gravity were Raritan, Seminole, BR5960-5, BR6316-5, and RD311.

Size determinations for two size classes are presented in Maine Table 2. Many of the early and medium-maturing varieties had quite high percentages of tubers below $2\frac{1}{4}$ inches in diameter. Note the low percentages of size A ($2\frac{1}{4}$ to 4) for Norchip, B5458-6, B5698-8, Oromonte, and Cobbler. Late maturing varieties sized up well which reflects better late-growing conditions for those selections.

Results of the first chipping and french fry tests are presented in Maine Tables 3 and 4, respectively. Chip colors were relatively dark at Presque Isle for most varieties, but at Corinna in Central Maine, colors were relatively light for many varieties. The only varieties that were satisfactory (7.0 or less) at all test locations were Norchip, RD311, B5665-7, B5698-8, B5613-1, BR5960-13, and BR6316-5. Practically all varieties except Raritan, BR6312-2, and BR6315-4 were satisfactory in french fry color (3.0 or less). Five of the varieties had unsatisfactory texture (1.2 plus).

Many more detailed studies were conducted with the varieties grown in Maine tests during 1970. For more detailed information consult the Annual Maine, New Hampshire, Vermont Potato Variety Trial report. A Maine Agricultural Experiment Station bulletin.

Maine Table 1. Yield and specific gravity of potato varieties grown at three locations in Maine - 1970

Variety	Presque Isle		Washburn		Corinna	
	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity	Yield Cwt./A.	Specific Gravity
Cobbler	292	1.076	225	1.090	184	1.070
Desiree	281	1.082	262	1.085	226	1.076
Katahdin	346	1.080	338	1.082	306	1.070
Kennebec	337	1.076	304	1.083	284	1.069
Norchip	261	1.082	223	1.088	180	1.073
Oromonte ¹	331	1.086	348	1.082	343	1.072
Raritan	---	1.086	---	1.090	---	1.083
Russet Burbank	288	1.084	294	1.081	230	1.077
Seminole	253	1.088	197	1.096	175	1.081
Superior	321	1.082	268	1.091	239	1.075
B5458-6	213	1.074	161	1.082	149	1.066
B5665-7	314	1.076	313	1.080	222	1.077
B5698-8	310	1.077	309	1.073	206	1.065
B5613-1	310	1.078	251	1.085	221	1.075
B6024-3	328	1.072	257	1.073	248	1.066
B6039-1	234	1.077	177	1.084	155	1.074
BR5957-7	327	1.079	329	1.081	263	1.074
BR5960-5	341	1.090	350	1.089	300	1.078
BR5060-13	337	1.090	365	1.086	333	1.075
BR5967-7	335	1.086	310	1.086	260	1.082
BR5970-4	326	1.081	328	1.083	319	1.073
BR6246-2	405	1.076	372	1.075	328	1.070
BR6306-22	320	1.065	209	1.076	251	1.060
BR6312-2	463	1.065	471	1.064	406	1.063
BR6315-4	377	1.070	332	1.077	311	1.065
BR6316-4	406	1.080	406	1.078	353	1.076
BR6316-5	349	1.088	362	1.086	281	1.078
F5810	316	1.080	274	1.086	249	1.078
F59103	275	1.069	250	1.079	207	1.060
F6111	280	1.079	287	1.079	236	1.077
RD311	269	1.084	216	1.091	200	1.077
L.S.D. (0.05)	27	0.004	31	0.003	41	0.003

¹Yields not taken because of very poor plant stands.

Maine Table 2. Percentage of yield between 1-7/8 and 4 inches in diameter
for varieties grown at three locations in Maine - 1970.

Variety	Presque Isle		Washburn		Corinna	
	1-7/8 to 4 inches	2-1/4 to 4 inches	1-7/8 to 4 inches	2-1/4 to 4 inches	1-7/8 to 4 inches	2-1/4 to 4 inches
Cobbler	90.6	62.7	85.4	38.8	85.7	48.2
Desiree	92.4	65.8	94.7	75.3	92.9	66.6
Katahdin	95.5	78.5	96.6	79.6	96.4	79.9
Kennebec	96.3	85.1	96.0	80.3	96.2	84.9
Norchip	84.8	40.6	84.4	37.4	80.2	26.1
Oromonte	92.7	64.2	92.9	66.4	94.1	75.7
Russet Burbank	67.3% 4 - 10 oz.		67.6% 4 - 10 oz.		65.2% 4 - 10 oz.	
Seminole	95.3	76.9	96.7	79.9	93.9	61.1
Superior	96.0	75.5	96.0	68.6	94.2	58.5
B5458-6	89.4	43.4	83.6	36.0	92.3	51.5
B5665-7	94.0	67.8	96.2	74.2	94.3	70.2
B5698-8	84.8	43.0	89.0	46.7	81.4	35.1
B5613-1	93.3	70.1	93.1	66.8	91.1	61.1
B6024-3	95.3	66.6	92.9	51.1	93.7	64.0
B6039-1	86.7	48.8	84.5	27.9	84.6	32.6
BR5957-7	97.6	84.2	98.1	83.8	96.7	80.9
BR5960-5	92.2	64.1	93.9	68.1	95.1	74.1
BR5960-13	97.9	84.9	96.7	85.1	95.0	87.3
BR5967-7	96.8	84.4	98.0	84.6	95.3	73.5
BR5970-4	94.7	69.3	94.4	68.8	95.4	75.4
BR6246-2	93.8	66.8	92.6	62.9	92.6	64.9
BR6306-22	96.0	74.3	96.1	68.8	88.0	42.6
BR6312-2	95.4	88.8	95.2	84.1	96.0	83.0
BR6315-4	93.8	76.5	95.5	76.4	93.7	70.1
BR6316-4	94.5	85.3	95.0	82.2	93.3	80.6
BR6316-5	97.2	78.5	96.1	77.9	97.0	78.2
F5810	91.9	66.4	93.5	63.4	87.4	58.6
F59103	96.2	79.1	97.0	72.1	96.5	80.4
F6111	94.1	72.8	96.3	76.9	94.5	70.1
RD311	95.3	78.3	93.7	66.5	94.7	76.7

Maine Table 3. Chip color indices for potato varieties grown at three locations in Maine - 1970¹

Variety	Presque Isle	Corinna	Washburn
Cobbler	8.9	7.6	7.9
Desiree	6.5	7.7	6.0
Katahdin	7.9	8.6	5.9
Kennebec	8.2	7.5	6.0
Norchip	6.3	5.0	4.5
Oromonte	7.8	9.2	6.1
Raritan	9.9	9.7	8.2
Russet Burbank	7.7	8.8	6.9
Seminole	7.6	5.4	5.0
Superior	7.3	6.1	5.1
B5458-6	8.9	7.3	7.5
B5665-7	6.5	5.9	4.2
B5698-8	6.7	5.2	3.5
B5613-1	6.8	6.4	5.3
B6024-3	8.5	7.4	6.6
B6039-1	9.0	7.0	7.0
BR5957-7	7.5	7.6	4.8
BR5960-5	8.1	8.1	5.6
BR5960-13	6.3	5.9	4.1
BR5967-7	8.5	8.7	7.0
BR5970-4	8.7	8.2	7.4
BR6246-2	8.0	8.1	6.6
BR6306-22	7.8	6.5	5.4
BR6312-2	10.0	10.0	10.0
BR6315-4	10.0	10.0	10.0
BR6316-4	8.9	9.2	5.8
BR6316-5	7.1	7.2	4.8
F5810	9.7	9.7	7.3
F59103	9.2	6.7	7.8
F6111	8.7	8.9	7.3
RD311	5.0	4.0	4.0
L.S.D. (0.05)	0.8	0.7	0.7

¹Chips with lower index numbers are lighter in color.

Maine Table 4. French fry color and texture indices for potato varieties grown at Presque Isle, Maine - 1970¹

Variety	Color Index	Texture Index
Cobbler	2.7	1.00
Desiree	1.7	1.23
Katahdin	1.8	1.03
Kennebec	2.0	1.03
Norchip	1.2	1.00
Oromonte	1.3	1.43
Raritan	3.4	1.07
Russet Burbank	1.9	1.10
Seminole	1.4	1.00
Superior	1.9	1.03
B5458-6	1.8	1.00
B5665-7	1.0	1.33
B5698-8	1.1	1.07
B5613-1	1.6	1.03
B6024-3	1.9	1.13
B6039-1	2.2	1.00
BR5957-7	1.7	1.03
BR5960-5	2.4	1.00
BR5960-13	1.0	1.00
BR5967-7	2.3	1.03
BR5970-4	2.5	1.30
BR6246-2	1.7	1.13
BR6306-22	1.8	1.00
BR6312-2	4.7	1.50
BR6315-4	4.6	1.13
BR6316-4	2.2	1.03
BR6316-5	1.3	1.10
F5810	2.4	1.00
F59103	2.6	1.03
F6111	3.0	1.10
RD311	1.1	1.00
L.S.D. (0.05)	0.6	N.S.

¹French fries with lower index numbers are lighter in color.
Low texture indices indicate mealier texture.

Maine Table 5. Pertinent information about Maine Cooperative Potato
Variety Trials - 1970

	Presque Isle	Corinna	Washburn
<u>Planted</u>	May 21	May 16	June 8
<u>Killed</u>			
Early varieties	Aug. 24	Aug. 24	Sept. 7
Medium varieties	Sept. 8	Sept. 3	Sept. 17
Late varieties	Sept. 18	Sept. 13	Sept. 28
<u>Harvested</u>			
Early varieties	Sept. 9	Sept. 9	Sept. 17
Medium varieties	Sept. 18	Sept. 14	Sept. 28
Late varieties	Sept. 28	Sept. 23	Oct. 8
<u>Fertilization</u>			
(Pounds per Acre)	130-130-130	130-130-130	130-130-130
<u>Seedpiece Spacing</u>			
	1 —	1 —	1 —

¹Seedpieces of Norchip spaced 10 inches apart; Russet Burbank and
Desiree spaced 16 inches apart; all other varieties 8 inches.

MICHIGAN
N. R. Thompson

Seed Production

Approximately 28,000 seeds from 42 crosses involving S. stoloniferum hybrids and an early high yielding S. tuberosum clone were produced. From 1000 seeds planted in the greenhouse 735 progenies were classified as early or late. The small tubers plus plants from the balance of the seed will be planted in the field in 1971. Sixty-seven selections were retained from the 1970 first-year seedlings.

Seedling Increase and Yield Trials

Forty-six advanced seedling clones were planted in replicated trials for yield and quality evaluation. Heavier than normal rainfall promoted vigorous growth. The absence of frost prolonged the growing season and some late-maturing cultivars were still blossoming when harvested in October. Yield and quality (Table 1) reflect the growth conditions. Seedlings MS 735-1, MS 711-8, MS 706-34 and Ia 1111-2 have established yield and quality potentials and will be increased for seed and storage trials.

Nutritional Studies

The potato, with the exception of the amino acid methionine, is a well balanced food. In the 1969 studies, one cultivar contained sufficient methionine to balance the protein, but to screen seedling populations for methionine a rapid test was essential. Bioassay with streptococcus zymogenes, a bacterium with the same amino acid requirement as man, proved practical.

Random samples from a segregating population comprising 834 clones from 12 families were tested for methionine. Differences within and between family lines were great. Selected individuals have been planted for hybridization to produce more cultivars with high methionine and to study the inheritance pattern.

Michigan Table 1. Seedling yield trial, 1970.*

Seedling No.	Average Yield Cwt/Acre	Average Specific Gravity
MS 735-1	699	1.086
MS 645-1	638	1.078
MS 613-21	585	1.079
Merr. 58	542	1.072
MS 711-8	507	1.065
MS 613-7	503	1.064
MS 613-18	484	1.080
MS 637	465	1.092
MS 709	473	1.071
MS 706-34	453	1.068
MS 613-30	453	1.066
MS 506-1	446	1.063
MS 503-14	442	1.068
MS 321-55	438	1.094
MS 613-20	438	1.077
MS 463	427	1.083
MS 321-65	415	1.093
Ia 1111-2	414	1.064

*Yields below 400 cwt/acre not included.

Report of Over State Trials in Michigan

1970

N. R. Thompson and R. W. Chase

A long growing season and above average rainfall combined to produce high yields. Table 2, seven inches of rainfall in September delayed harvests and contributed to lower than normal total solids in some entries. The later maturing varieties were still actively growing when harvested in October.

In the first year of trials, Cascade, an oblong potato and Sioux, a red, produced the highest yields in both locations. The high yields resulted from a preponderance of oversize tubers. Population studies to determine spacing for optimum yields of marketable tubers will give a better evaluation of the varieties. Jewel, a midseason variety has a slightly flattened tuber, high total solids and usually chips satisfactorily. The desire to produce potatoes for potato chip processing resulted in a rapid increase in acreage of Norchip. This variety sets a large number of tubers and spacings should be adjusted to permit them to attain the desired size.

Overstate Yield Trial - 1970 in cwts/acre.

Variety	Montcalm County			Allegan County		
	US #1	B's	Specific Gravity	US #1	B's	Specific Gravity
Cascade	594	15	1.072	528	19	1.069
Sioux	528	9	1.079	450	34	1.065
Kennebec	521	10	1.074	415	10	1.075
Katahdin	515	5	1.068	386	23	1.069
Haig	473	15	1.071	315	46	1.062
Jewel	469	13	1.088	402	17	1.084
MS 711-3	463	13	1.089	350	25	1.084
Norchip	457	7	1.085	377	27	1.072
Onaway	438	17	1.064	392	23	1.067
Sebago	427	19	1.067	380	6	1.068
MS 709	398	8	1.068	371	17	1.071
Superior	392	3	1.070	359	17	1.065
Monona	388	5	1.068	323	23	1.062
Merr. 58	382	10	1.072	319	15	1.063
Ia 1111-2	369	15	1.065	271	15	1.062
Shurchip	359	10	1.068	344	15	1.065
MS 503	357	17	1.079	396	27	1.076

The Effect of Different Fertility Levels on The
Yields, Specific Gravity and Chipping Quality
of Several Chipping Varieties

Procedure

Varieties: Haig, Jewel, Katahdin, Kennebec, Monona, Norchip, MS-709,
Superior

Fertility: Plowdown with rye cover 65 lbs/acre N Planter 800 lbs/acre
14-14-14 + 2% Mg

Planted: May 5, 1970. Spacing: 34" x 8"

Harvested: September 18, 1970

Sidedress treatments: (applied June 5, 1970)

1. Check - no sidedress nitrogen
2. 60 lbs N/acre
3. 120 lbs N/Acre
4. 180 lbs N/acre

Results

Table 3 summarizes the yield response to the sidedress treatments. There were no significant differences in terms of cwt/acre to the fertilizer treatments. All varieties, however, except Jewel, did respond to the initial 60 pounds of nitrogen sidedress with increased yields. The Haig and Monona also showed an additional increase in yield with the 120-pound application. Although the trend does exist, these differences were not significant. Other studies and reports have similarly shown that the Haig variety does have a heavy requirement for adequate nitrogen early in its growth.

Table 2 summarizes the specific gravity, chip quality and size distribution by varieties. There were no significant differences between the sidedress treatments on the yield of B's or tubers in the 1-7/8" - 3-1/4" range or specific gravity. There was, however, a significant response in the yield of tubers over 3-1/4" - Table 3.

Variety Comments

Haig - In 1968 and 1969 the incidence of "speckle leaf" in this variety was severe in some cases. In 1970 the overall occurrence of this condition was very slight. The need for adequate nitrogen early in its growth was apparent in both 1969 and 1970. Its maturity is early.

Jewel - This variety was erratic in response to the use of additional nitrogen. Its yields were well above the average, it does have a high total solids and it produces a very acceptable chip color. The two years of tests with this variety have shown favorable results.

Katahdin - In both 1969 and 1970 this variety has responded only to the initial application of additional nitrogen which was 80 pounds in 1969 and 60 pounds in 1970.

Kennebec - The Kennebec was the highest yielding variety in this study and at this spacing the tubers were very uniform in size and well shaped.

Monona - The tubers of this variety were round and quite uniform. The dry matter content was less than Kennebec, however, it did produce a very acceptable chip color.

Norchip - This variety exhibited a favorable yield potential and a desirable chip color. The spacing of 8 inches used in this study was too close for this variety as it does set heavy, and adequate space must be provided for sizing.

MS-709 - In 1969, this was highest yielding variety in this same study, however, in 1970 it was the lowest yielder. This is due in part to the poor quality of seed as the emergence and plant vigor were retarded throughout the entire growing season. Normally, this variety is fully matured by mid-September, however, at the time of harvest this year blossoms were still present.

Superior - As similarly noted with the other varieties, the Superior did not respond to additional sidedress applications above the 60 pound level.

Samples taken from each plot have been placed in storage to determine chip quality at varying intervals. One set of samples is being held at 55°F to determine the ability to remain in an acceptable chipping condition. A second set of samples was placed in 40°F to determine reconditioning potential.

Michigan Table 3. The percentage of tubers over 3-1/4 inch of several potato varieties in response to nitrogen sidedress treatments.

Treatment	Haig	Jewel	Katahdin	Kennebec	Monona	Norchip	MS-709	Superior
Check - no sidedress	8.9	18.0	14.5	21.1	16.0	6.0	19.8	14.5
60 lbs N	11.4	26.1	17.9	24.6	22.9	7.4	25.0	20.4
120 lbs N	10.3	29.9	22.3	28.9	27.5	3.9	31.8	17.5
180 lbs N	14.1	29.4	21.7	35.3	29.1	5.8	22.4	18.3

Michigan Table 4. The yield of several potato varieties in response to different nitrogen sidedress treatments. Total cwt per acre.

Treatment	Haig	Jewel	Katahdin	Kennebec	Monona	Norchip	MS-709	Superior
Check - no sidedress	414	503	385	534	406	450	390	401
60 lbs N	437	474	432	581	442	488	427	451
120 lbs N	465	482	437	560	460	476	358	452
180 lbs N	431	520	419	571	413	467	337	447
Variety Ave.	437	495	418	561	430	470	378	438

Michigan Table 5. The size distribution, specific gravity and chip ratings of several potato varieties. Overall average by variety.

Variety	Percent Size Distribution			Specific Gravity	% Dry Matter	Harvest Chip Rating*
	B's	1-7/8"-3-1/4"	Over 3-1/4"			
Haig	5.8	83.0	11.2	1.063	16.0	4.0
Jewel	3.2	70.9	25.9	1.081	19.9	3.5
Katahdin	5.0	75.9	19.1	1.068	17.1	5.0
Kennebec	3.4	69.1	27.5	1.072	18.0	4.5
Monona	2.8	73.3	23.9	1.065	16.5	3.0
Norchip	5.7	88.5	5.8	1.076	18.8	3.0
MS-709	3.4	71.8	24.8	1.063	16.0	6.0
Superior	2.7	79.6	17.7	1.070	17.5	3.5

* 1-10 scale 1 = lightest, 10 = darkest

MINNESOTA

F.I. Lauer, E.B. Radcliffe, O.C. Turnquist, and C.J. Eide

This report has two sections: (1) a summary of variety trials at several Minnesota locations, and (2) evaluation of resistance to green peach aphid and to potato aphid in selected wild tuber-bearing Solanum species.

1970 MINNESOTA POTATO VARIETY PLOTS

Potato variety demonstrations were conducted at nine locations in 1970. In the Red River Valley, plots were located at Baker, Crookston and Grand Forks. Plots were also grown on the lighter soils at Fosston and at the North Central Experiment Station at Grand Rapids. In the irrigated area near the Twin Cities, plots were grown at Osseo, Elk River and Big Lake. In southern Minnesota, another plot was located on the organic soil at Hollandale. These trials are conducted in cooperation with commercial growers, county agricultural agents, branch experiment stations and the Minnesota Department of Agriculture. The purpose of the demonstrations is to familiarize the grower with new varieties and to assist him in evaluating the varieties for use in his area.

All seed for the plots were produced the previous year under strict quarantine control at the isolated University of Minnesota potato seed increase farm at Embarrass, Minnesota. The potato increase and testing program is made possible through the financial assistance of the Minnesota Department of Agriculture Seed Potato Division.

All plots consisted of twenty varieties and selections planted in twenty-hill rows and replicated twice. Not all of the varieties tested were included at each location. A total of 54 varieties and selections were tested at Baker, Crookston and Elk River for adaptation, yield and quality, but these data for 30 advanced selections will not be summarized in this report.

At harvest time the potatoes from the entire plot were weighed and graded for size. Samples were taken for specific gravity and chipping. The performance of the varieties and selections is reported in Tables 2, 3, 4, 5, 6, 7, 8, 9, 10. A summary of the results of three locations in the Red River Valley is presented in Table 1. Results of the chipping test after a 6-week storage period at 40°F and after a 6-week reconditioning period will be reported when the work is completed this winter.

A spacing trial was conducted at the Red River Valley Potato Research Farm at Grand Forks, North Dakota, by Mr. Ed. Plissey, Area Extension Agent in potatoes. This included the varieties Monona, Norchip and Norchief using a 9", 12" and 15" spacing. Results are presented in Table 11.

Minnesota Table 1. Potato Variety Performance for Three Locations in the Red River Valley 1970*

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	(%)		(%)
Norgold	240	87	1.084	20.5
Norchip	235	84	1.090	21.8
Wauseon	234	87	1.085	20.7
ND 6925-13**	230	87	1.080	19.7
Red Pontiac	227	94	1.077	19.0
Norchief	223	84	1.083	20.3
Chieftain	215	87	1.078	19.2
Norland	212	90	1.074	18.4
Kennebec	211	90	1.085	20.7
Iopride	211	90	1.080	19.7
Alamo	210	85	1.078	19.2
ND 6993-13	209	80	1.088	21.4
Irish Cobbler	207	87	1.085	20.7
Minn 4086	206	80	1.087	21.2
Shurchip	205	83	1.082	20.1
Monona	204	90	1.079	19.4
Minn 174	199	89	1.092	22.2
Sioux	199	89	1.075	18.6
Anoka	197	87	1.085	20.7
Peconic	195	79	1.094	22.7
ND 7003-2	193	86	1.068	17.1
Jewell	192	78	1.099	23.7
Bake King	185	91	1.095	22.9
Early Gem	183	88	1.071	17.7
Grand Falls	171	84	1.089	21.6
Minn 1317	164	79	1.079	19.4
Average	206	86	1.083	20.3

* Average at Baker, Crookston, Grand Forks

** Grand Forks only

Minnesota Table 2. Potato Variety Demonstration Planting, Baker, Minnesota, 1970

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Wauseon	334	80	1.085	20.7
Kennebec	235	94	1.087	21.2
Norgold	234	93	1.084	20.5
Norchip	210	86	1.088	21.4
Alamo	205	92	1.074	18.4
Peconic	204	83	1.095	22.9
Norland	198	93	1.074	18.4
Red Pontiac	195	94	1.072	18.0
Norchief	194	77	1.084	20.5
Irish Cobbler	187	87	1.082	20.1
Anoka	186	86	1.086	20.9
Chieftain	183	92	1.076	18.8
ND 7003-2	180	81	1.067	16.9
Monona	178	90	1.078	19.2
Shurchip	175	80	1.080	19.7
Iopride	173	91	1.078	19.2
Minn 4086	166	85	1.082	20.1
ND 6993-13	164	75	1.090	21.8
Early Gem	162	90	1.070	17.5
Minn 174	160	88	1.089	21.6
Bake King	158	91	1.097	23.3
Jewel	153	66	1.101	24.2
Sioux	151	91	1.072	18.0
Grand Falls	151	89	1.096	23.1
Minn 1317	129	76	1.080	19.7
Average	187	86	1.083	20.3

Cooperators: Grower: Frank Thompson & Sons, Baker, Minnesota
County Agricultural Agent: Ozzie Daellenbach, Clay County,
Moorhead, Minnesota

Planted: May 16, 1970
Harvested: September 15, 1970
Spacing: 38"Row, 12"Hills
Fertilizer: 300 lbs. 12-36-12 with planter.
Insecticide: Thimet, Guthion, Thiodan
Fungicide: Duter (4 applications)

Minnesota Table 3. Potato Variety Demonstration Planting, Crookston, Minnesota, 1970

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Red Pontiac	215	92	1.084	20.5
Norchip	212	74	1.096	23.1
Norgold	211	78	1.087	21.2
Norchief	209	82	1.089	21.6
Iopride	198	86	1.086	20.9
Minn 4086	194	59	1.097	23.3
Sioux	194	88	1.082	20.1
ND 6993-13	193	75	1.086	20.9
Shurchip	186	87	1.092	22.2
Norland	185	82	1.079	19.4
Monona	184	86	1.083	20.3
Alamo	184	83	1.092	22.2
Chieftain	182	75	1.084	20.5
Kennebec	179	82	1.093	22.4
Jewell	177	74	1.103	24.6
Minn 174	173	85	1.101	24.2
Peconic	173	62	1.100	24.0
ND 7003-2	171	83	1.071	17.7
Irish Cobbler	169	81	1.090	21.8
Early Gem	169	82	1.074	18.4
Wauseon	163	89	1.095	22.9
Grand Falls	163	74	1.092	22.2
Anoka	152	83	1.088	21.4
Bake King	151	85	1.105	25.0
Minn 1317	140	66	1.085	20.7
Average	181	80	1.089	21.6

Cooperators: Grower: B. C. Beresford, Northwest Experiment Station,
Crookston, Minnesota

Planted: May 19, 1970

Harvested: September 9, 1970

Vines Killed: Rotobeat September 4, 1970

Spacing: 40" Row, 12" Hill

Fertilizer: 250 lbs. 5-20-20

Insecticides: Thimet, Toxaphene, Malathion, Systox, Phosphamidon

Fungicide: Difolatan

Minnesota Table 4. Potato Variety Demonstration Planting, Grand Forks, North Dakota, 1970

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter	Chip Color*			
					A	B	C	D
	cwt	%		%	Ag	Ag	Ag	Ag
Norchip	283	93	1.086	20.9	17	47	43	54
Chieftain	281	93	1.074	18.4	11	27	18	36
Norgold	274	91	1.081	19.9	8	16	19	28
Red Pontiac	271	95	1.074	18.4	9	26	20	32
ND 6993-13	269	91	1.089	21.6	12	36	35	47
Minn 174	265	95	1.085	20.7	17	32	38	48
Irish Cobbler	265	95	1.076	18.8	15	30	27	41
Norchief	265	92	1.076	18.8	12	30	31	43
Iopride	261	93	1.077	19.0	10	33	26	36
Minn 4086	259	96	1.083	20.3	15	35	34	46
Shurchip	254	81	1.075	18.6	10	44	40	45
Anoka	252	92	1.080	19.7	9	27	28	46
Norland	252	95	1.069	17.3	12	35	37	41
Sioux	252	89	1.072	18.0	10	32	39	46
Monona	249	93	1.076	18.8	17	37	45	51
Bake King	247	96	1.083	20.3	12	20	27	31
Jewell	246	94	1.094	22.7	20	44	40	52
Alamo	242	80	1.069	17.3	9	25	20	40
ND 6925-13	230	87	1.080	19.7	11	27	23	34
ND 7003-2	227	93	1.066	16.7	12	27	18	33
Minn 1317	223	95	1.073	18.2	9	36	37	44
Kennebec	219	95	1.076	18.8	12	31	34	37
Early Gem	219	92	1.070	17.5	10	22	17	30
Peconic	209	92	1.088	21.4	11	42	42	48
Wauseon	204	92	1.074	18.4	9	25	23	42
Grand Falls	199	89	1.080	19.7	13	30	38	46
Average	247	92	1.078	19.2				

* Chip color Agtron readings by Roy Shaw, Red River Valley Potato Processing Lab.

A - Samples stored to Nov. 19, 1970, at 40°F.

B - Samples stored to Nov. 19, 1970, at 50°F.

C - Samples stored to Nov. 19, 1970, at 40°F. plus 4 weeks more at 65°F.

D - Samples stored to Nov. 19, 1970, at 50°F. plus 4 weeks more at 65°F.

Note-Agtron readings above 40 will make acceptable chips commercially

Cooperators: Area Potato Agent: Ed Plissey, East Grand Forks, Minnesota

Grower: Don Uhler, Mgr. Red River Valley Potato Research Farm,
Grand Forks, North Dakota

Planted: May 26, 1970

Harvested: September 10, 1970

Vines Rotobeat: September 3, 1970

Fertilizer: 350 lbs. 8-16-12

Spacing: 38" Row, 12" Hills

Minnesota Table 5. Potato Variety Demonstration Planting, Fosston, Minnesota, 1970

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Red Pontiac	235	69	1.068	17.1
Kennebec	224	84	1.077	19.0
Norchip	213	66	1.078	19.2
Irish Cobbler	178	78	1.081	19.9
Grand Falls	176	66	1.085	20.7
Norchief	161	74	1.071	17.7
Anoka	150	80	1.065	16.5
Chieftain	141	76	1.070	17.5
Minn 4086	130	58	1.072	18.0
Minn 174	129	76	1.083	20.3
Norland	124	73	1.068	17.1
ND 6993-13	120	73	1.084	20.5
Russet Burbank	118	60	1.085	20.7
Wauseon	115	75	1.071	17.7
Norgold	113	55	1.073	18.2
Minn 1317	108	72	1.066	16.7
Peconic	103	79	1.076	18.8
Bake King	98	--	1.093	22.4
Jewell	97	35	1.079	19.4
ND 7003-2	83	17	-----	----
Average	141	67	1.076	18.8

Cooperators: Grower: Robert Roysland, Fosston, Minnesota
County Agricultural Agent: Harley Shurson, East Polk County
McIntosh, Minnesota

Planted: June 12, 1970

Harvested: October 21, 1970

Spacing: 38" Row, 12" Hills

Fertilizer: 250 lbs. 15-30-15

Minnesota Table 6. Potato Variety Demonstration Planting, Big Lake, Minnesota, 1970.

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Kennebec	723	99	1.065	16.5
Jewel	702	94	1.081	19.9
Minn 4086	691	98	1.063	16.0
Anoka	690	96	1.063	16.0
Grand Falls	690	98	1.075	18.6
Norchief	674	92	1.066	16.7
Peconic	653	97	1.072	18.0
Red Pontiac	627	98	1.056	14.5
Chieftain	624	96	1.067	16.9
Alamo	593	94	1.060	15.4
Norland	583	96	1.052	13.7
Norgold	577	96	1.063	16.0
Norchip	572	92	1.069	17.3
Wauseon	560	98	1.067	16.9
Minn 1317	553	97	1.051	13.5
Bake King	548	96	1.074	18.4
Irish Cobbler	543	92	1.073	18.2
ND 7003-2	442	94	1.051	13.5
Minn 174	402	87	1.065	16.5
Early Gem	325	96	1.054	14.1
Average	589	95	1.064	16.2

Cooperator: Grower, Les Zimmerman & Sons, Big Lake, Minnesota,
County Agricultural Agents

Planted: April 30, 1970

Harvested: October 15, 1970

Spacing: 36" Rows, 12" Hills

Fertilizer: 1700 lbs. per A 9-23-30 with planter
Sidedress 400 lbs. per acre 33 1/3-0-0 plus
Sidedress 450 lbs. per acre 9-23-30

Insecticide: Every 7-10 days from June 17 to Aug. 23 with a combination of
either Difolatan and Sevin, Duter and Sevin or Duter and Thiodan

Irrigation: 14 times of 1" per application from June 9 to Aug. 28 every 5 days

Minnesota Table 7. Potato Variety Demonstration Planting, Elk River, Minnesota, 1970.

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Norchief	573	83	1.075	18.6
Grand Falls	544	95	1.069	17.3
Peconic	527	88	1.086	20.9
Irish Cobbler	526	84	1.073	18.2
Chieftain	514	92	1.069	17.3
Iopride	504	89	1.069	17.3
Alamo	493	89	1.069	17.3
Red Pontiac	488	93	1.056	14.5
Anoka	487	83	1.069	17.3
Norgold	481	85	1.073	18.2
Norchip	481	84	1.082	20.1
Minn 1317	480	88	1.056	14.5
Jewel	464	81	1.088	21.4
Wauseon	440	92	1.075	18.6
Monona	433	91	1.068	17.1
Shurchip	431	87	1.077	19.0
Kennebec	424	93	1.066	16.7
Norland	414	85	1.058	15.0
Minn 4086	413	82	1.064	16.2
Sioux	398	75	1.060	15.4
ND 6993-13	397	83	1.071	17.7
Bake King	347	84	1.087	21.2
Minn 174	314	86	1.074	18.4
Early Gem	294	93	1.055	14.3
ND 7003-2	286	82	1.057	14.8
Average	446	87	1.070	17.5

Cooperator: Darryl Nelson, Sand Plain Experimental Field, Elk River, Minn.

Planted: April 28, 1970

Harvested: September 1, 1970

Spacing: 36" Rows, 12" Hills

Fertilizer: 1200 lbs per Acre 8-16-16 with planter.

Herbicide: Eptam 6 lbs per acre, preplanting soil incorporation

Insecticide: Thimet 15G 13 lbs. per Acre

Minnesota Table 8. Potato Variety Demonstration Planting, Osseo, Minnesota, 1970.

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Norchief	500	93	1.060	15.4
Red Pontiac	485	96	1.057	14.8
Alamo	484	92	1.064	16.2
Grand Falls	470	94	1.076	18.8
Norland	443	97	1.059	15.2
Anoka	433	93	1.069	17.3
Minn 4086	432	94	1.071	17.7
Norgold	431	94	1.066	16.7
Wauseon	424	96	1.067	16.9
Kennebec	423	96	1.069	17.3
Norchip	408	92	1.075	18.6
Irish Cobbler	406	90	1.073	18.2
Jewel	402	90	1.078	19.2
Iopride	400	96	1.066	16.7
Chieftain	375	94	1.064	16.2
Peconic	353	92	1.075	18.6
Bake King	350	89	1.081	19.9
Minn 1317	344	97	1.061	15.6
Minn 174	288	93	1.066	16.7
Early Gem	247	95	1.053	13.9
Average	405	94	1.068	17.1

Cooperator: Grower: Calvin Gray, Osseo, Minnesota
County Agricultural Agent: George Roadfeldt, Hennepin County
Minneapolis, Minnesota
Planted: May 8, 1970
Harvested: September 3, 1970
Spacing: 36" Rows, 12"Hills
Fertilizer: 400 lbs.per Acre K₂O fall of 1969
1000 lbs. per Acre 8-16-16 with planter
Sidedress at second cultivation with 300 lbs. per Acre 33 1/3-0-0
Sidedress at third cultivation with 300 lbs.per Acre 10-10-10
Spraying: Every 7-10 days with Manzate and Thiodan
Irrigation: 5 times

Minnesota Table 9. Potato Variety Demonstration Planting, Grand Rapids, Minnesota, 1970

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Norchief	369	93	1.080	19.7
Alamo	361	92	1.075	18.6
Kennebec	360	94	1.085	20.7
Minn 4086	360	90	1.082	20.1
Bake King	357	94	1.095	22.9
Jewell	348	93	1.097	23.3
Peconic	340	91	1.090	21.8
Monona	336	96	1.076	18.8
Irish Cobbler	324	97	1.085	20.7
Anoka	317	91	1.076	18.8
Norland	316	97	1.066	16.7
Norgold	316	96	1.073	18.2
Grand Falls	308	96	1.085	20.7
Red Pontiac	305	94	1.070	17.5
Minn 1317	286	90	1.085	20.7
Chieftain	274	92	1.075	18.6
ND 7003-2	273	94	1.072	18.0
Russet Burbank	257	96	1.085	20.7
Wauseon	239	82	1.099	23.7
Minn 174	234	93	1.077	19.0
Average	314	93	1.081	19.9

Cooperator: Grower: Dr. David Wildung, North Central Experiment Station
Grand Rapids, Minnesota

Planted: May 20, 1970

Harvested: September 17, 1970

Vines Killed: Rotobeat September 14, 1970

Spacing: 42" Row, 12" Hills

Fertilizer: 300 lbs 8-16-16

Irrigation: Two applications

Insecticides: Thimet, Sevin, Diazinon, Cygon, DDT

Fungicides: Dithane

Minnesota Table 10. Potato Variety Demonstration Planting, Hollandale, Minnesota, 1970

Variety	Total Yield Per Acre	U.S. No. 1 Size	Specific Gravity	Dry Matter
	cwt	%		%
Red Pontiac	643	98	1.062	15.8
Norchief	502	93	1.066	16.7
Cherokee	484	97	1.071	17.7
Bake King	462	96	1.078	19.2
Jewell	446	94	1.084	20.5
Chieftain	436	95	1.065	16.5
Kennebec	436	98	1.070	17.5
Norland	433	97	1.055	14.3
Minn 1317	431	96	1.063	16.0
Wauseon	423	97	1.070	17.5
Sioux	407	97	1.056	14.5
Peconic	401	95	1.078	19.2
Grand Falls	398	96	1.070	17.5
Irish Cobbler	385	94	1.066	16.7
Alamo	383	93	1.057	14.8
Iopride	380	97	1.063	16.0
Anoka	356	97	1.064	16.2
Norgold	339	91	1.063	16.0
Minn 4086	331	94	1.068	17.1
Minn 174	306	96	1.069	17.3
Average	419	96	1.067	16.9

Cooperators: Grower: Stegenga Bros, Hollandale, Minnesota
County Agricultural Agent: Eldon Senske, Freeborn County
Albert Lea, Minnesota

Planted: May 5, 1970

Harvested: October 6, 1970

Spacing: 34" Row, 12" Hills

Fertilizer: 500 lbs 0-14-42 Broadcast

Minnesota Table 11. Potato Seedpiece Spacing Trial, Potato Research Farm,
Grand Forks, N.D. 1970

Variety	Spacing	Total Yield Per Acre	Size Classes		
			0-2"	2-3 1/2"	3 1/2-up
		cwt	%	%	%
Monona	9"	258	8	86	6
	12"	271	11	85	4
	15"	218	11	79	10
Norchip	9"	321	13	86	1
	12"	348	13	83	4
	15"	302	12	83	5
Norchief	9"	263	8	91	1
	12"	250	10	82	8
	15"	246	7	85	8

Cooperators: Ed Plissey, Area Potato Agent, East Grand Forks, Minnesota
Orrin C. Turnquist, Extension Horticulturist, St. Paul, Minn.

Planted: May 27, 1970

Harvested: September 10, 1970

Vines Killed: September 4, 1970

Fertilizer: 400 lbs 12-36-12

RESISTANCE TO GREEN PEACH APHID AND POTATO APHID

From 1965-69, approximately 900 IR-1 Solanum introductions were surveyed as possible sources of resistance to green peach aphid and potato aphid. More than 80 species or species hybrids were represented in these trials.

In 1970, 380 introductions were evaluated. Included were introductions which had shown evidence of resistance in previous surveys, i.e., those which ranked within the most resistant 30% for either green peach aphid or potato aphid in the particular trial(s) in which they were included. There were also 58 introductions which had not been evaluated before.

In 1970, the green peach aphid infestation was exceptionally severe. Most susceptible plants were ultimately killed by green peach aphids. Late season counts on S. tuberosum tuberosum check clones ranged up to 50,000 per plant. Potato aphid populations were low.

As in previous years, the data were obtained by a timed sampling procedure. All 380 introductions were evaluated for both green peach aphid and potato aphid, July 27-30 (Tables 12 and 15). On the basis of the green peach aphid data, the most resistant 60% were reevaluated, August 10-12 (Tables 13 and 16) for resistance to both aphids. On the basis of the green peach aphid resistance in the 2nd count, the most resistant 60% were again reselected for a 3rd evaluation, August 24-27 (Tables 14 and 17).

For each of the counts, the introductions were scored according to the mean number of aphids per plant on a 1-5 scale (1=resistant, 5=susceptible). The class intervals, given in the table heading 12-17, were chosen to distribute the introductions equally into the 5 classes. Within each of the 5 classes, introductions of the same species are ranked with the most resistant listed first.

An analysis of variance was calculated for each count. Introductions with missing data were not used in statistical analysis but are included in the tables.

Minnesota Table 12. Relative resistance of tuber-bearing Solanum introductions to green peach aphid. July 27-30, 1970.

a/	
Resistance class 1, 1.00-20.00 aphids/plant	<u>brachistotrichum</u> (Bitt.) Rydb., WRF 1271, PI 320265; <u>brevioidens</u> Phil., PI 245764; <u>bulbocastanum</u> Dun., WRF 1729, PI 275200, PI 275194, PI 255518, WRF 1565, PI 275189, PI 255516, PI 275188, PI 275197, PI 275195; <u>canasense</u> Hawkes, PI 246533, PI 310941, PI 265863, PI 283074, PI 210035, PI 310955, PI 310940, PI 265864; <u>capsicibaccatum</u> Cardenas, PI 205560; <u>cardiophyllum</u> Lindl., PI 255520, PI 275213, PI 186548, PI 279272, PI 275214; <u>chomatophilum</u> , Och S-42, PI 266387, PI 243340, Och S-43, Och S-35, PI 310991, PI 310943, PI 310990; <u>etuberosum</u> Lindl., PI 245924, PI 245939; <u>jamesii</u> Torr., PI 195190, PI 275170; <u>marinasense</u> Vargas, WRF 1533, PI 310945; <u>michoacanum</u> (Bitt.) Rydb., PI 255540, PI 255537, PI 255542, PI 255541, PI 255538, PI 283064; <u>multidissectum</u> Hawkes, PI 275271, PI 210051, PI 210052, PI 265876; <u>ochranthum</u> Dun., PI 230508; <u>polyadenium</u> Grenm., PI 310963; <u>polytrichon</u> Rydb., PI 184773; <u>sanctae-rosae</u> Hawkes, PI 218221, PI 230464, PI 205397, PI 275152; <u>stenophyllidium</u> Bitt., PI 255528, PI 255527, PI 255530; <u>stoloniferum</u> Schlecht. & Bche., PI 255532, PI 275248, PI 195195, PI 310980, PI 160226, PI 186563, PI 275249, PI 201855; <u>tuberosum andigena</u> (Juz. & Buk.) Hawkes, PI 237208; <u>tuberosum tuberosum</u> L., PI 245317; <u>tuquerrense</u> Hawkes, PI 338614; unidentified, Och S-15, Och S-34, Och S-6, Och S-68
a/	
Resistance class 2, 20.60-33.60 aphids/plant	<u>andreaeanum</u> Baker, WRF 1144; <u>berthaultii</u> Hawkes, PI 265858; <u>brachistotrichum</u> , PI 283095; <u>bulbocastanum</u> , PI 243508, PI 275196, PI 243509, PI 243506, PI 243512, PI 275198, PI 243513, PI 275193; <u>canasense</u> , PI 283084, PI 310939, PI 310956, PI 310937, PI 265875, PI 230511, PI 283073, Och S-12, PI 310938; <u>cardiophyllum</u> , PI 184762, PI 275216, WRF 276, PI 275215; <u>clarum</u> Corr., PI 243355, PI 275202; <u>commersonii</u> Dun., PI 320266; <u>demissum</u> Lindl., PI 161155; <u>fendleri</u> A. Gray, PI 275160; <u>gourlayi</u> Hawkes, PI 210038, PI 265579; <u>hjertingii</u> Hawkes, PI 186560, PI 251067, PI 283103, PI 275174; <u>infundibuliforme</u> Phil., PI 310976, PI 275146; <u>marinasense</u> , PI 310947; <u>medians</u> Bitt., PI 320260; <u>megistacrolobum</u> Bitt., PI 233125; <u>michoacanum</u> , PI 255536, PI 255539; <u>multidissectum</u> , PI 210055, PI 210042, PI 230506; <u>oxycarpum</u> Schiede, PI 186568; <u>papita</u> Rydb., PI 262895; <u>pascoense</u> Ochoa, Och S-76; <u>polyadenium</u> , PI 320342; <u>polytrichon</u> , PI 184770; <u>sanctae-rosae</u> , PI 283089, PI 320325; <u>spagazzinii</u> , PI 203876, PI 275144; <u>stenophyllidium</u> , PI 255529; <u>stenotomum</u> Juz. Buk., PI 195188, PI 205526; <u>stoloniferum</u> , PI 195167, PI 310964, PI 161171, PI 205522, PI 161178, PI 255534, PI 275246, PI 201849, PI 161364, PI 225661, PI 275245, PI 338621, PI 275250; <u>tuberosum andigena</u> , PI 280901, PI 280905, PI 280914; unidentified, Och S-33, Och S-11; <u>verrucosum</u> Schlecht., PI 275256

Minnesota Table 12. Continued

a/

Resistance class 3, 33.67-46.89 aphids/plant acaule Bitt., PI 275127, PI 266381, PI 175395; ambosinum Ochoa, Och S-47, Och S-61; bulbocastanum, PI 243507, PI 243504, PI 275185, PI 275199, PI 243345, PI 275184; cardiophyllum, PI 275212, PI 283063; chiquidenum Ochoa, PI 230514; chomatophilum, Och S-73, Och S-71; commersonii, PI 320269; demissum, PI 218047, PI 230589, PI 230592; hjertingii, PI 186559, PI 251063, PI 251065; hougasii Corr., PI 161174; infundibuliforme, PI 283077; leptophyes Bitt., PI 310932; marinasense, PI 310944; megistacrolobum, PI 265879, PI 320303; moscopanum Hawkes, PI 230462; multidissectum, Och S-9, PI 210043; multiinterruptum Bitt., PI 265886; oxycarpum, PI 230479; phureja Juz. & Buk., PI 225679, PI 225674, Och SC-105; polytrichon, PI 275240, PI 255547; sanctae-rosae, PI 320324; spgazzinii, PI 208562; stenotomum, PI 234013; stoloniferum, PI 195166, PI 161172, PI 160224, PI 255548, PI 275247, PI 275252, PI 255525; tuberosum andigena, PI 195162, PI 233987, PI 243387, PI 243403, PI 280907, PI 243419, PI 243390, PI 232839, PI 232054, PI 184903, PI 281021, PI 280887, PI 233994, PI 280869, PI 281119, PI 186177; unidentified, Och S-5; verrucosum, PI 160228, PI 320344, PI 310966, PI 195172, PI 275254, PI 275255, PI 338624, PI 195171, PI 275259, PI 275258

- a/ For each *Solanum* species the various introductions are ranked within classes from the most resistant, listed first, to most susceptible. Class intervals, expressed as mean no. aphids/plant, chosen to distribute the introductions into 5 classes of near equal size. Means based on a sample of 1-5 plants in each of 4 replications. Standard error of mean is 9.24.
- b/ Data missing for 1 or more replicates, these means did not contribute to statistical treatment.

Minnesota Table 13. Relative resistance of tuber-bearing Solanum introductions to green peach aphid. August 10-12, 1970.

a/

Resistance class 1, 8.00-41.38 aphids/plant brachistotrichum, PI 320265, WRF 1271, PI 283095; brevidens, PI 245764; bulbocastanum, PI 255518, WRF 1729, PI 275194, PI 275200, WRF 1565, PI 275197, PI 255516, PI 275195, PI 275189, PI 275188; canasense, PI 283074, PI 265863, PI 210035; capsicibaccatum, PI 205560; cardiophyllum, PI 255520, PI 275214, Och S-42, PI 243340, Och S-43, PI 266387; clarum, PI 243355; etuberosum, PI 245939, PI 245924; gourlayi, PI 210038; jamesii, PI 195190; lignicaule, PI 310993; megistacrolobum, PI 233125; michoacanum, PI 255540, PI 255537, PI 255542, PI 255538, PI 255536; oxycarpum, PI 230479; polyadenium, PI 320342; sanctae-rosae, PI 205397, PI 275152, PI 230464, PI 218221; stenophyllidium, PI 255529, PI 255528; stoloniferum, PI 195167, unidentified, Och S-33

a/

Resistance class 2, 42.00-55.63 aphids/plant berthaultii, PI 265858; bulbocastanum, PI 243508, PI 275193, PI 243506; canasense, PI 246533, PI 310940, Och S-12, PI 310937; cardiophyllum, PI 275212, PI 275216, PI 184762, PI 275213, PI 310990, PI 310943, Och S-35; clarum, PI 275202; demissum, PI 230592; infundibuliforme, PI 275146; jamesii, PI 275170; marinasense, PI 310945, WRF 1533; michoacanum, PI 255541; multiinterruptum, PI 265886; multidissectum, PI 275271, PI 210052, PI 265876, PI 210051; oxycarpum, PI 186568; polyadenium, PI 310963; polytrichon, PI 184773; sanctae-rosae, PI 320325; stenotomum, PI 195188; stoloniferum, PI 255532, PI 195195, PI 275248, PI 201855, PI 310964, PI 275246, PI 186563; tuberosum tuberosum, PI 245317; tuquerrense, PI 338614; unidentified, Och S-6, Och S-15, Och S-68, Och S-34

a/

Resistance class 3, 56.11-71.00 aphids/plant acaule, PI 175395; bulbocastanum, PI 243512, PI 243513, PI 275196, PI 243509, PI 275198; canasense, PI 310956, PI 310938, PI 310941, PI 265864, PI 283073, PI 310939; cardiophyllum, PI 186548, PI 279272, PI 275215; chomatophilum, PI 310991, Och S-71; commersonii, PI 320267, PI 320266; demissum, PI 230589; hjertingii, PI 283103, PI 251063; ochranthum, PI 230508; marinasense, PI 310947, PI 310944; megistacrolobum, PI 265879; michoacanum, PI 255539, PI 283064; multidissectum, PI 210042; sanctae-rosae, PI 283089, PI 320324; spgazzinii, PI 208876; stenophyllidium, PI 255530, PI 255527; stoloniferum, PI 161171, PI 275249, PI 160226, PI 310980, PI 161172, PI 205522, PI 255534, PI 161178; tuberosum andigena, PI 237208, PI 195162; unidentified, Och S-63; verrucosum, PI 275254

a/ See footnote table 12. Standard error of the mean is 12.28

b/ See footnote table 12.

Minnesota Table 14. Relative resistance of tuber-bearing Solanum
introductions to green peach aphid. August 24-27, 1970

a/

Resistance class 1, 17.00-69.71 aphids/plant brachistotrichum, PI 320265; bulbocastanum, PI 275200, PI 275194, WRF 1565, WRF 1729, PI 255518, PI 275196, PI 243508, PI 275197, PI 275195, PI 243509, PI 275188, PI 275189, capsicibaccatum, PI 205560; chomatophilum, Och S-42, PI 310943, PI 243340, PI 266387; gourlayi, PI 210038; infundibuliforme, PI 275146; marinasense, PI 310945; megistacrolobum, PI 265879; michoacanum, PI 255540; multidissectum, PI 210055; sanctae-rosae, PI 275152, PI 283089; stenophyllidium, PI 255528; unidentified, Och S-33

a/

Resistance class 2, 71.13-89.50 aphids/plant berthaultii, PI 265858; brachistotrichum, WRF 1271; bulbocastanum, PI 243513, PI 275193, PI 255516; canasense, PI 283074, PI 265864; cardiophyllum, PI 255520, PI 186548; chomatophilum, PI 310990, Och S-43; etuberosum, PI 245924; jamesii, PI 195190; marinasense, PI 310944; megistacrolobum, PI 233125; michoacanum, PI 255542, PI 255541; multidissectum, PI 275271; multiinterruptum, PI 265886; sanctae-rosae, PI 205397, PI 230464, PI 218221, PI 320324, PI 320325; spgazzinii, PI 208876; stoloniferum, PI 195167; tuquerrense, PI 338614; unidentified, Och S-6

a/

Resistance class 3, 89.67-100.08 aphids/plant bulbocastanum, PI 243512, PI 275199, PI 243506; canasense, PI 246533, PI 310940; cardiophyllum, PI 275214, PI 275212, PI 279272; chomatophilum, PI 310991, Och S-71; lignicaule, PI 310993; marinasense, WRF 1533; michoacanum, PI 255538, PI 255536; multidissectum, PI 210052; oxycarpum, PI 186568, polyadenium, PI 320342, PI 310963; polytrichon, PI 184773; stenophyllidium, PI 255530, PI 255529; stoloniferum, PI 275249, PI 255532, PI 310980, PI 161172, PI 161171; unidentified, Och S-34, Och S-15

a/ See footnote Table 12. Standard error of mean 13.08.

b/ See footnote Table 12.

Minnesota Table 15. Relative resistance of tuber-bearing Solanum introductions to potato aphid. July 27-30, 1970.

a/
Resistance class 1, 0.00-0.08 aphids/plant acaule, PI 230494, Och S-83; ambosinum, Och S-47; andreanum, WRF 1144; brachistotrichum, PI 320265; brachycarpum, PI 275183; bulbocastanum, PI 255518, PI 255516, PI 275188, PI 275197, PI 275195, PI 243512, PI 243513, PI 275185, PI 275199, PI 275196, PI 275194, PI 275189, PI 243345; canasense, PI 265864, Och S-12; cardiophyllum, PI 255520, PI 275215; chiquidenum, PI 230514; chomatophilum, Och S-42, PI 243340, Och S-71; clarum, PI 243355, PI 275202; colombianum, PI 320346; demissum, PI 230589, PI 230592; PI 161155; fendleri, PI 275160; gandarillasii, PI 265866; hjertingii, PI 251063; hougasii, PI 161174; huancabamense, Och 021x024; infundibuliforme, PI 275146; iopetalum, PI 275182; medians, PI 320260; moscopanum, PI 230462; multidissectum, PI 230506; ochranthum, PI 230508; oxycarpum, PI 230479; pampasense, WRF 1576; polytrichon, PI 184770, PI 275241; sogarandinum, PI 230510; stenophyllidium, PI 255528, PI 255529; stoloniferum, PI 195195, PI 275249, PI 205522, PI 275246, PI 161364, PI 338621, PI 160226, PI 161178, PI 161172, PI 255525, PI 310980; tuberosum andigena, PI 233987, PI 232041, PI 246497, PI 195162, PI 243390, PI 280869, PI 281119; tuberosum tuberosum, PI 245317, 'Sebago'; unidentified, Och S-60; verrucosum, PI 160228, PI 310966, PI 275254, PI 195171

a/
Resistance class 2, 0.09-0.29 aphids/plant acaule, PI 266381, Och S-21, Och S-74, Och S-17; brachistotrichum, WRF 1271; bulbocastanum, PI 275198, WRF 1729, PI 243509, PI 243511, PI 243506; canasense, PI 310939, PI 210035, PI 310937; cardiophyllum, PI 255519, PI 186548; chancayense, PI 338615; chomatophilum, Och S-43, PI 310990; commersonii, PI 320266, PI 320267; demissum, PI 218047, PI 160229, PI 161167; fendleri, PI 255543, PI 251062; gourlayi, PI 210038; hjertingii, PI 186560, PI 275174, PI 251067, PI 251065; iopetalum, PI 275181; michoacanum, PI 255537, PI 255542, PI 255539; microdontum, WRF 1283; multidissectum, PI 210055, PI 210044, PI 275271; oxycarpum, PI 186568, PI 275224; papita, PI 283105, PI 262895; phureja, PI 225693; polyadenium, PI 320342; polytrichon, PI 184773, PI 255545; stenotomum, PI 234009, Och 3-46; stoniferum, PI 201849, PI 195166, PI 201855, PI 310964, PI 225661, PI 195167, PI 160224, PI 275247; tuberosum andigena, PI 237208; PI 243403, Och SC-100, PI 233988, PI 280905, PI 245800, PI 281014, WRF 1579; tuberosum tuberosum, W5279-25, Minn code 5363; tuquerrense, PI 338614; unidentified, Och S-34, Och S-68, Och S-15, Och S-62, Och S-6; verrucosum, PI 275255, PI 195172, PI 275256, PI 275258

a/
Resistance class 3, 0.30-0.63 aphids/plant acaule, PI 230529, PI 275127, PI 275129, PI 230530; ambosinum, Och S-61; brachycarpum, PI 243344; bukasovii, Och S-28; bulbocastanum, WRF 1565, PI 275193; canasense, PI 265863, PI 310938, Och S-24, PI 283073, PI 283084, PI 310940, PI 246533, PI 310941, PI 230511; cardiophyllum, WRF 276; chomatophilum, Och S-35, PI 310991, PI 266387, Och S-73; commersonii, PI 320269; curtilobum, WRF 1531; demissum, PI 230591, PI 160222, PI 161164,

Minnesota Table 15. Continued

PI 310962, PI 161719; etuberosum, PI 245939; hjertingii, PI 186559, PI 283103;
hougasii, PI 161726, WRF 1736; medians, PI 265872; megistacrolobum, PI 265578;
multidissectum, PI 210051, PI 210043, PI 210042, PI 210052, PI 265876;
multiinterruptum, Och S-27, Och S-85; phureja, PI 225679; pinnatisectum,
PI 275236; sanctae-rosae, PI 275152; sparsipilum, Och SC-95, PI 265871; stenotomum,
PI 234013, PI 195188; stoloniferum, PI 275248, PI 283109, PI 161171; tuberosum
andigena, PI 243373, PI 186177, PI 233984, PI 232839, PI 243387, PI 197757,
PI 243394, PI 281021, PI 280907, Och SC-103, PI 280883, PI 230472, PI 280909;
tuberosum tuberosum, 'Russet Burbank'; unidentified, Och S-54, Och S-33, Och S-7;
verrucosum, PI 338624, PI 275259, PI 320344, PI 251756

a/ See footnotes table 12. Standard error of mean is 1.03.

b/ See footnote table 12.

Minnesota Table 16. Relative resistance of tuber-bearing Solanum introductions to potato aphid. August 10-12, 1970.

a/

Resistance class 1, 0.00-0.09 aphids/plant acaule, PI 175395, PI 275127; bulbocastanum, PI 255518, WRF 1729, PI 275197, PI 255516, PI 243508, PI 275193, PI 275198, PI 275188; canasense, PI 283073; cardiophyllum, PI 255520, PI 186548; chomatophilum, PI 243340; clarum, PI 275202; demissum, PI 230592, PI 230589; iopetalum, PI 275181; multidissectum, PI 210043; ochranthum, PI 230508; oxycarpum, PI 230479, PI 186568; pascoense, Och S-76; polytrichon, PI 184770, PI 275240; stenophyllidium, PI 255529; stoloniferum, PI 195195, PI 201855, PI 275249, PI 161178, PI 338621, PI 161172, PI 310980, PI 205522, PI 255548; tuberosum andigena, PI 195162, PI 280907; tuberosum tuberosum, 'Anoka'; unidentified, Och S-15, Och S-34, Och S-63, Och S-11; verrucosum, PI 160228, PI 310966, PI 320344

a/

Resistance class 2, 0.10-0.44 aphids/plant acaule, PI 266381; bulbocastanum, PI 275195, PI 275189, PI 275184, PI 275194, PI 275200, PI 243513, PI 243506, PI 275199; canasense, Och S-12, PI 265863, PI 265864; cardiophyllum, PI 275215; chomatophilum, PI 310990, Och S-35; clarum, PI 243355; hjertingii, PI 251063, PI 186559, PI 275174, PI 283103, PI 186560; hougasii, PI 161174, WRF 1569; moscopanum, PI 230462; multidissectum, PI 275271, PI 230506; stenotomum, PI 205526; stoloniferum, PI 225661, PI 186563, PI 310964, PI 255525, PI 275247, PI 195167, PI 195166, PI 160224; tuberosum andigena, PI 281021; tuberosum tuberosum, PI 245317, 'Sebago', W5279-25; tuquerrense, PI 338614; unidentified, Och S-33, Och S-6; verrucosum, PI 275254, PI 195172, PI 275255, PI 195171, PI 275256

a/

Resistance class 3, 0.45-1.00 aphids/plant ambosinum, Och S-47; berthaultii, PI 265858; bulbocastanum, PI 275196, PI 243509; canasense, PI 310938, PI 310955, PI 310937, PI 210035; cardiophyllum, PI 279272; chomatophilum, Och S-43, Och S-71, Och S-73; commersonii, PI 320267; demissum, PI 161155, PI 218047; gourlayi, PI 210038; infundibuliforme, PI 275146; lignicaule, PI 310993; marinasense, PI 310945; medians, PI 320260; michoacanum, PI 283064, PI 255542, PI 255536; multidissectum, PI 210052, PI 210042, PI 210055; papita, PI 262895; pinnatisectum, PI 275236; polytrichon, PI 184773; stenotomum, Och S-46, PI 195188; stenophyllidium, PI 255528; stoloniferum, PI 275246, PI 275250, PI 201849, PI 161171, PI 160226, PI 275248; tuberosum andigena, PI 280905, PI 280914, PI 233987, PI 232054, PI 237208, PI 280901; verrucosum, PI 338624

a/ See footnote table 12. Standard error of the mean is 1.61.

b/ See footnote table 12.

Minnesota Table 17. Relative resistance of tuber-bearing Solanum introductions to potato aphid. August 24-27, 1970.

a/

Resistance class 1, 0.00 aphids/plant bulbocastanum, PI 275194, PI 275197, PI 275189, PI 275193, PI 255516, PI 275198; canasense, PI 265864, PI 310938, PI 310937, PI 210035; cardiophyllum, PI 255520, PI 186548; clarum, PI 275202, PI 243355; demissum, PI 230589, PI 230592; infundibuliforme, PI 275146; multidissectum, PI 210055, PI 210052; oxycarpum, PI 186568; stenotomum, Och S-46; stenophyllidium, PI 255529; stoloniferum, PI 161172, PI 161171, PI 205522, PI 275248, PI 186563; tuberosum andigena, PI 280907; tuberosum tuberosum, W5279-25, 'Anoka', unidentified, Och S-63; verrucosum, PI 160228, PI 275254

a/

Resistance class 2, 0.08-0.25 aphids/plant bulbocastanum, PI 275196, PI 243508, PI 243512, PI 275195, PI 243513, PI 275199, PI 243504, PI 255518; canasense, PI 310941; chomatophilum, PI 310991, PI 266387; commersonii, PI 320266; michoacanum, PI 255541, PI 255537; stenotomum, PI 195188; stoloniferum, PI 310964, PI 201855, PI 195167, PI 275249, PI 275246; tuberosum andigena, PI 237208; tuberosum tuberosum, PI 245317; tuquerrense, PI 338614; unidentified, Och S-34, Och S-15, Och S-6

a/

Resistance class 3, 0.29-0.50 aphids/plant brachistotrichum, WRF 1271; bulbocastanum, PI 275188, PI 275200, WRF 1729, PI 243509, PI 243506; canasense, PI 265863, PI 310956, PI 310940; cardiophyllum, PI 279272, PI 184762; chomatophilum, Och S-42, PI 310990; gourlayi, PI 210038; jamesii, PI 195190; lignicaule, PI 310993; megistacrolobum, PI 265879; multidissectum, PI 275271; multiinterruptum, PI 265886; stenophyllidium, PI 255528; stoloniferum, PI 310980, PI 195195; tuberosum tuberosum, 'Chisago', 'Sebago', unidentified, Och S-33

a/ See footnote table 12. Standard error of the mean is 0.90.

b/ See footnote table 12.

NEW JERSEY
John C. Campbell

Rutgers University conducted 3 potato variety trials in 1970, to evaluate new USDA and various state breeding stocks and recently named varieties under New Jersey conditions.

Vegetable Research Farm, Rutgers. Seed of 22 seedlings and 10 named varieties was machine-cut April 7-10, treated with captan dust and held in a damp basement at 55-60°F until April 13 when it was hand-planted.

Seedpieces were spaced 10" x 36" and 1900 lb/A of a 10-20-10 fertilizer was side-banded by planter when the rows were opened.

Two 1-1/2" applications of water were made with overhead sprinkler irrigation to supplement rainfall. Insects and late blight were controlled with a regular weekly spray schedule.

The vines were rotobeat September 3 and harvested September 21.

The tubers were graded for size and market quality on a John Bean rubber spool grader. Specific gravity was determined by the weight in air-weight in water method.

All data are shown in Table 1. The 10 highest yielding varieties include 7 USDA seedlings Abnaki, Raritan and Peconic. Norchip and 3 other seedlings produced yields similar to the Chippewa, Katahdin and Superior which are our standard varieties. Pennchip, Seminole, and Jewel produced relatively low yields.

Specific gravity levels were all relatively low, however, seedling BR6290-9 had a specific gravity of 1.0880 and 7 other seedlings plus Raritan had specific gravities above 1.070.

George Coombs' Farm, Shirley - In cooperation with Campbell Institute for Agricultural Research. Twelve seedlings and 10 named varieties were compared in this study. Seed was hand-spaced 10" x 34" in 20' plots replicated 4 times on May 7. Excessive rainfall during April and early May caused a 3-week delay in planting. One ton per acre of 6-12-8 fertilizer was side-banded when the rows were opened. Insects and late blight were controlled with a regular spray schedule used by the owner.

Yields of over 400 cwt/acre of U.S. No. 1 potatoes were produced by six seedlings Abnaki, Superior, and Raritan. Other varieties producing relatively good yields include Norchip, Peconic, Chippewa, and Katahdin (Table 2).

Specific gravity levels above 1.080 were found in B6138-3, BR6290-9, B6595-5, and Raritan, while five other varieties had specific gravity readings above 1.070.

George Rue Farm, Imlaystown. The variety trial on this farm was machine planted in 2-row plots 300 feet long on April 28. Seed was spaced 9 inches apart in 36 inch rows. A 7-14-14 fertilizer at 2200 lb/A was placed in side-bands at planting. Eptam 5G at 130 lb/A and Thimet 10 G at 20 lb/A were also applied for weed and insect control. Sprays for insect and disease control were applied as needed by the owner.

Nine named varieties and one seedling were compared.

The potatoes were harvested October 13 after all plants had died. Yields were obtained from two sections 2 rows wide and 36 feet long. Table 3 presents the average yields and specific gravity obtained. Yields over 300 cwt. per acre of US No. 1 potatoes were produced by Abnaki, Norchip, Raritan and Superior. All of the recently named varieties and the Penn State seedling out-yielded Katahdin (Table 3).

All varieties were relatively low in specific gravity. Raritan had the highest specific gravity of only 1.0686 which is much lower than this variety had in the other trials.

New Jersey Table 1. Potato variety yields and specific gravity.

Vegetable Research Farm, Rutgers University, New Brunswick, N. J.

1900 lbs/A of 10-20-10 banded

Seed hand dropped 10" x 36" plots 20 ft. long

Replicated 4 times

Planted April 13, 1970

Vines rotobeat Sept. 3, 1970

Harvested Sept. 21, 1970.

Variety	Yield cwt/Acre		Percent over 2"	Percent B Size	Specific Gravity*	Tuber Rating**	Remarks
	US#1 s Over 2"	Total					
B6595-5	545	605	90	8	742	3	
B6537-4	494	536	92	5	681	4	
BR6312-2	465	553	84	7	486	2+	7% knobby
B6138-3	443	508	91	6	707	2	
B6567-12	428	480	89	7	652	2+	
Abnaki	414	445	93	6	627	3	
BR6316-7	392	433	90	7	730	3	
B6044-14	370	423	86	6	699	3	7% knobby
Raritan	356	427	83	9	730	3	3% knobby
Peconic	356	378	94	4	656	3	
BR5946-9	341	370	92	7	656	3+	
Norchip	327	372	88	8	648	3	
BR5965-3	327	356	92	5	620	3+	
BR6456-1	327	355	92	6	583	3+	
B6463-2	319	388	82	14	659	3+	
Chippewa	319	360	89	6	540	3	3% lenticel spot
BR6290-9	319	343	93	4	880	3+	
Katahdin	312	340	92	6	540	3+	
Superior	312	337	93	5	627	3	
B6139-11	312	370	84	14	761	3+	
B5400-8	305	347	88	5	718	3+	6% scab
BR5967-7	305	334	91	5	739	3	3% knobby
BR6317-21	305	354	86	6	503	3+	7% knobs & growth cracks
BR6527-33	305	346	88	6	622	3+	5% knobs & growth cracks
6HS9	305	336	91	8	612	3+	
BR6316-4	298	330	90	6	614	3+	3% knobs & growth cracks
Pennchip	298	327	91	6	667	3	2% knobs & growth cracks
BR5948-1	276	311	89	7	735	2+	3% knobs & growth cracks
Seminole	276	296	93	5	682	3	
Jewel	276	319	86	10	617	3	
BR6563-2	254	303	84	11	584	3+	3% late blight rot
B6587-11	232	286	81	10	555	2	8% knobby

LSD 5% 39 cwt.

LSD 1% 47 cwt.

* = 1.0 omitted from specific gravity values

** = 1 - poor, 5 - excellent appearance

New Jersey table 2. Potato variety yields and specific gravity, George Coombs farm, Shirley, N. J., in cooperation with Campbell Institute for Agricultural Research.

2000 lbs/A of 6-12-8 banded
Seed spaced 10" x 34" plots 20 ft. long
Replicated 4 times

Seed cut April 10, 1970
Planted May 7, 1970
Harvested October 13, 1970

Variety	Yield cwt/Acre		Percent over 2"	Specific Gravity*	Tuber Rating**	Remarks
	US#1 s Over 2"	Total				
BR6312-2	474	550	86	572	2	
B6595-5	459	510	90	802	3	
BR5946-9	454	486	93	745	3+	
Abnaki	444	475	94	666	3+	
BR5965-3	438	468	94	693	3+	
6HS9	425	462	92	691	3+	
B6567-12	415	463	89	698	3	
Superior	414	436	95	690	3+	
Raritan	404	443	91	822	3+	
Norchip	394	433	91	718	3	
Peconic	384	420	91	699	3+	
Chippewa	378	439	86	618	3+	
Katahdin	375	395	95	598	3+	
B6138-3	373	431	87	846	2+	
B5400-8	366	412	89	774	3+	
BR6290-9	351	378	93	822	3+	
Jewel	349	400	87	740	3	
B6587-11	349	388	90	658	3+	
Seminole	347	360	96	764	3	
B6527-33	333	359	93	662	4	
B6563-2	296	338	88	696	4	
Pennchip	285	348	82	684	3	

LSD 5% 46
LSD 1% 57

* = 1.0 omitted from specific gravity values
** = 1 - poor, 5 - excellent appearance

New Jersey table 3. Rutgers University - George Rue farm, Imlaystown, N. J.

2200 lbs/A 7-14-14 Planted April 29, 1970
Seed spaced 9" x 36" plots 300 ft. long Harvested October 13, 1970

Variety	Yield cwt/Acre		Percent		Specific Gravity*	Tuber Appearance Rating**	Remarks
	US#1s Over 2"	Total	US#1s Over 2"	US#1s B's			
Abnaki	325	342	95	2	594	3	Sl. A.P. injury.
Norchip	305	332	92	7	612	3+	Sev. A.P. injury, Mod. to Sev. Eptam injury
Superior	276	300	92	6	612	3+	Very sl. A.P. injury.
Raritan	258	300	86	6	686	4	Sl. A.P. injury, Mod. to Sev. Eptam injury.
6HS9	256	278	92	7	605	3+	Sev. A.P. injury.
Jewel	252	296	85	13	530	3	Mod. A.P. injury.
Seminole	241	256	94	5	646	3	Vines dead early, no A.P. reading.
Pennchip	231	262	88	10	618	2	Sev. A.P. injury
Katahdin	220	242	91	7	526	3+	Sev. A.P. injury
Peconic	215	242	89	9	572	3	Mod. to Sev. A.P. injury, Sl. Eptam injury.

* 1.0 omitted from specific gravity values.

** 1 - poor, 5 - excellent appearance.

A.P. = Air Pollution

Mod. = Moderate

Sev. = Severe

Sl. = Slight

NEW JERSEY

C. E. Cunningham, R. L. Nickeson, and T. E. Snyder

Campbell Institute for Agricultural Research

The primary objective of the potato breeding program is to develop or identify potato varieties that contribute to improved quality of processed products, to greater efficiency in processing, and that are adaptable and economical to produce.

Crosses among selected clones are made in greenhouses at Riverton, New Jersey and seedlings are grown in greenhouses at Riverton and at West Chicago, Illinois.

Approximately 40,000 first-year seedlings were grown on the potato breeding farm at Perham in Aroostook County, Maine. Sixteen hundred selections were grown in 12-hill plots, 225 selections were in 60-hill plots and 73 selections were increased for subsequent testing at a number of locations. In addition, 250 selections from 2N X 4N pollinations were grown in 12-hill plots.

Clones identified with a BR prefix are selections from crosses made independently in Campbell greenhouses and maintained on the USDA Chapman Farm during the period of a cooperative agreement for potato breeding between the USDA and Campbell Soup Company.

Data reported are results from replicated potato variety trials at the following locations:

<u>Location</u>	<u>Planting Date</u>	<u>Harvest Date</u>
Perham, Maine	Week of May 27	Week of Sept. 14
Shirley, New Jersey	May 7	Sept. 8
Ebensburg, Penna.	May 28	Oct. 14
LaPorte, Indiana	May 15	Oct. 6

Fertilization and cultural practices were those recommended for the areas. Plots were harvested, and potatoes were shipped to the Riverton Laboratory for subsequent storage and processing tests.

A late planting season in Maine followed by a dry growing season resulted in yields lower than normal and generally lower specific gravity.

Potato dice following freezing may appear gray or glassy and translucent when in milk resulting in unattractive products. Lower translucency ratings indicate dice with greater opacity and whiteness.

Retained weights are indicative of sloughing of dice following a standard laboratory procedure reported in previous reports. Higher retained weights indicate lesser sloughing.

Laboratory procedures for testing french fry and mash quality were the same as those outlined in the 1968 Report. Tubers were stored at 45°F. prior to being processed. The minimum rating for acceptable french fry texture is 3.5, that for color is 3.0; for mash the minimum rating for acceptable texture is 3.0.

Table 1. Yield, specific gravity, appearance rating of tubers and translucency rating and retained weight of frozen dice - Perham, Maine, 1970

Pedigree	Yield over 2"		Specific Gravity ^{1/}	Tuber ^{2/} Rating	Translucency ^{3/} Rating	Retained Weight ^{4/} %
	Cwt/A	%				
BR5946-9	348	96	71	4	8.8	25
BR5967-7	303	95	75	3+	7.2	10
BR6261-1	264	92	69	3+	6.2	22
BR6263-2	305	91	69	3+	8.2	12
BR6265-8	270	91	66	3	8.6	15
BR6306-22	286	94	67	2+	5.8	14
BR6315-4	378	92	62	4	6.8	31
BR6317-21	287	88	68	3	5.4	13
BR6317-25	206	77	75	4	4.6	19
BR6446-2	336	95	65	3+	6.4	14
BR6448-7	343	96	63	4	6.8	27
BR6456-1	303	95	70	4	6.2	11
BR6609-7	265	96	78	3	7.4	9
BR6614-1	302	96	69	4	8.2	14
BR6617-2	294	96	66	3+	6.8	10
BR6626-5	385	96	70	3	7.8	16
BR6820-26	315	89	66	3+	5.6	19
BR6820-29	359	93	73	3+	6.2	10
Wauseon	375	95	70	3+	7.2	12
Katahdin	276	91	61	4	7.8	15
B6537-4	294	94	69	3	7.3	15
B6587-8	218	75	69	2+	8.2	20
B6591-7	312	90	67	2	7.6	14
Mean	305	92	69		7.0	16
LSD (.05)	48		3		0.9	6
(.01)	64		5		1.2	8
C.V.%	12.6		3.5		10.4	30.2

1/ 1.0 deleted.

2/ 1 - poor to 5 - excellent.

3/ Lower ratings indicate lesser translucency.

4/ Higher values indicate lesser sloughing.

Table 2. Yield, specific gravity, appearance rating of tubers and translucency rating and retained weight of frozen dice - Shirley, N. J., 1970

Pedigree	Yield over 2"		Specific ^{1/} Gravity	Tuber ^{2/} Rating	Translucency ^{3/} Rating	Retained ^{4/} Weight %
	Cwt/A	%				
BR5967-7	385	94	86	3	6.3	16
BR6261-1	162	95	50	4	5.3	61
BR6263-2	353	87	62	3	8.0	39
BR6265-8	308	90	61	4	7.8	19
BR6306-22	448	94	58	3	6.5	34
BR6315-4	369	89	62	4	6.8	36
BR6317-21	308	89	58	4	6.8	31
BR6446-2	382	94	68	3	7.3	22
BR6448-7	426	96	59	3	8.0	41
BR6456-1	330	89	66	3+	6.3	24
BR6491-7	358	95	90	3+	7.0	31
BR6609-7	305	91	66	2+	8.0	24
BR6614-1	369	87	67	2+	7.5	18
BR6617-2	379	91	58	3	6.8	28
BR6626-5	381	84	78	3	7.0	14
BR6820-26	346	85	64	3+	6.5	32
BR6820-29	368	90	64	4	7.5	21
Wauseon	348	94	67	3	6.5	21
Katahdin	351	94	66	4	7.3	13
B5141-6	364	92	94	4	8.3	30
B6537-4	395	93	75	4	6.3	16
B6587-8	248	80	76	3+	7.5	25
B6591-7	323	83	71	4	7.3	7
Mean	348	90	68		7.0	26
LSD (.05)	53		4		1.0	9
(.01)	70		6			12
C.V.%	10.8		4.3		9.9	26.9

1/ 1.0 deleted.

2/ 1 - poor to 5 - excellent.

3/ Lower ratings indicate lesser translucency.

4/ Higher values indicate lesser sloughing.

Table 3. Yield, specific gravity, appearance rating of tubers and translucency rating and retained weight of frozen dice - La Porte, Indiana, 1970

Pedigree	Yield over 2"		Specific Gravity ^{1/}	Tuber ^{2/} Rating	Translucency ^{3/} Rating	Retained Weight ^{4/} %
	Cwt/A	%				
BR5967-7	390	94	79	3+	7.3	16
BR6261-1	248	94	55	4	6.8	37
BR6263-2	324	93	65	3+	9.5	14
BR6265-8	268	84	63	3	9.0	19
BR6306-22	286	86	62	2+	7.5	26
BR6317-21	238	86	68	3	7.0	18
BR6446-2	285	91	67	2	7.5	20
BR6456-1	290	88	68	3+	7.3	10
BR6609-7	283	91	71	3	7.8	12
BR6614-1	473	96	68	3	8.5	10
BR6626-5	378	86	71	3+	7.8	15
BR6820-26	328	85	67	3+	7.0	12
BR6820-29	277	82	69	3	8.0	11
Wauseon	332	92	70	3	6.5	10
Katahdin	317	95	67	2+	8.8	11
B 5141-6	390	90	89	3	8.8	33
B 6537-4	405	94	71	4	7.0	9
B 6587-8	261	92	75	2+	8.0	24
B 6591-7	343	90	66	3	7.3	6
Mean	322	90	69		7.4	16
LSD (.05)	80		4		0.8	7
(.01)	107		5		1.1	9
C.V.%	17.6		4.0		7.5	30.0

1/ 1.0 deleted

2/ 1 - poor to 5 - excellent.

3/ Lower ratings indicate lesser translucency.

4/ Higher values indicate lesser sloughing.

Table 4. Yield, specific gravity, tuber rating, translucency rating, retained weight, french fry color and texture for selections in early and medium maturity trial - Perham, Maine

<u>Yield above 2"</u>			<u>French fry</u>					
<u>Pedigree</u>	<u>Cwt./A</u>	<u>Per cent</u>	<u>S. G.</u> ^{1/}	<u>Tuber Appear.</u> ^{2/}	<u>Trans-lucency Rating</u> ^{2/}	<u>Retained Weight</u> ^{2/}	<u>Color</u> ^{3/}	<u>Texture</u> ^{4/}
BR6316-5	336	94	71	5	6.8	11	2.5	4.0
BR5968-4	263	94	63	4	6.4	16	3.1	4.6
BR6442-1	191	91	67	4	7.4	13	3.0	3.8
BR6820-15	313	93	66	3+	7.0	10	2.7	4.9
BR6820-16	305	89	61	4	6.4	9	3.1	4.8
BR6820-24	287	85	63	3	6.4	14	3.1	4.5
BR6831-5	233	91	77	3+	7.0	10	2.7	3.2
BR6851-2	278	92	75	3	7.6	10	2.9	4.1
BR6858-2	273	93	66	4	6.6	15	3.0	4.4
BR6859-3	272	91	75	3+	7.6	17	2.7	3.1
BR6863-8	314	93	78	4	7.4	19	3.1	3.7
BR6864-9	308	91	68	3+	6.6	4	2.9	4.4
B 5141-6	308	93	81	4	8.2	19	2.3	3.6
Alamo	315	93	63	4	6.4	9	3.0	4.2
Chippewa	358	93	59	4	7.2	13	3.0	4.6
I. Cobbler	280	89	72	2+	7.6	18	2.6	3.9
Kennebec	313	95	64	4+	7.8	20	2.4	4.6
Monona	268	91	67	4	8.8	12	2.1	5.0
Mean	290	92	68		7.2	13	2.8	4.2
LSD (.05)	60		5		1.2	5	0.4	0.7
(.01)	79		7		1.6	7	0.6	1.0
C.V.-%	16.4		5.7		12.9	30.9	12.6	13.9

1/ 1.0 deleted

2/ Refer to footnotes of Table 1.

3/ Rating 1-5, 1 = very little color, 5 = dark brown (3.0 and below is considered acceptable)

4/ Rating 1-5, 1 = dry mealy, 5 = wet soggy (3.5 and below is considered acceptable)

Table 5. Yield, specific gravity, tuber rating, translucency rating, retained weight, french fry color and texture for selections in late maturity trial - Perham, Maine

Pedigree	Yield above 2"			Tuber Appear. 2/	Trans- lucency Rating 2/	French fry		
	Cwt./A	Per cent	S. G. 1/			Retained Weight 2/	Color 3/	Tex- ture 3/
BR5970-4	289	89	66	4	7.8	4	3.4	4.9
BR6246-2	239	84	63	2	7.2	13	3.0	4.7
BR6273-1	267	94	66	-	8.6	27	2.8	4.7
BR6290-9	236	90	76	3	8.8	24	3.0	4.1
BR6293-12	212	87	71	3	8.4	33	2.0	4.2
BR6312-2	239	91	51	2+	7.6	12	3.2	4.6
BR6491-7	254	94	75	4	10.2	25	2.8	3.9
BR6820-10	248	83	62	3+	5.8	11	2.5	4.6
BR6820-14	222	90	58	3	9.0	16	3.0	5.0
BR6822-5	255	93	67	4	6.4	14	3.0	4.0
BR6824-1	217	81	76	2	7.0	4	1.8	4.1
BR6834-1	213	83	60	2+	7.4	11	2.8	4.0
BR6844-1	281	96	53	3	7.2	19	3.0	5.0
BR6854-4	209	81	65	3	7.6	12	3.6	4.9
BR6862-2	249	91	70	4+	6.2	13	2.7	4.1
BR6863-2	234	95	74	-	7.8	16	1.9	4.6
BR6863-3	238	91	75	3	5.6	14	2.2	3.3
BR6863-7	279	89	73	-	8.2	18	2.5	4.1
BR6864-8	282	88	65	-	6.8	8	2.5	4.7
BR6871-5	225	88	63	3	6.6	7	2.9	4.3
BR6900-2	280	92	64	4	7.2	13	2.8	4.8
BR6480-3	248	89	62	3	6.6	18	3.0	4.2
BR6488-1	219	90	58	3+	7.8	15	3.0	4.9
Gr. Mtn.	275	90	63	3+	7.4	17	3.4	4.5
G. Falls	250	83	67	3+	7.2	10	2.2	4.5
Katahdin	233	91	59	3+	7.0	6	3.0	4.7
Kennebec	280	93	61	-	7.4	21	2.6	4.7
Mohawk	255	94	64	-	7.4	16	3.3	4.9
R. Burbank	168	61	67	1+	8.0	17	2.9	4.0
Mean	245	88	65		7.5	15	2.8	4.4
LSD (.05)	43		4		1.0	6	0.4	0.6
(.01)	57		5		1.3	8	0.6	0.8
C.V.-%	14.1		4.3		10.5	32.3	11.9	10.4

1/ 1.0 deleted

2/ Refer to footnote of Table 1.

3/ Refer to footnote of Table 4.

Table 6. Yield, specific gravity, tuber rating, translucency rating, retained weight, french fry color and texture for selections in french fry trial - Perham, Maine

<u>Yield above 2"</u>					<u>French fry</u>			
<u>Pedigree</u>	<u>Cwt./A</u>	<u>Per cent</u>	<u>S. G.^{1/}</u>	<u>Tuber Appear.^{2/}</u>	<u>Trans-lucency Rating^{2/}</u>	<u>Retained Weight^{2/}</u>	<u>Color^{3/}</u>	<u>Texture^{3/}</u>
BR5948-1	173	88	80	2	7.0	17	3.0	2.9
BR5960-5	293	93	73	3	8.0	17	3.0	3.2
BR5967-7	256	92	71	3+	6.2	16	2.8	3.9
BR6290-3	290	91	72	3	7.0	19	3.0	4.4
BR6316-4	357	93	67	4	7.0	16	3.0	4.5
BR6316-7	279	91	68	3	7.0	23	3.0	4.3
BR6320-1	204	82	78	3	7.2	21	2.0	3.0
BR6463-1	212	86	77	2+	7.0	21	3.0	3.1
BR6463-2	266	89	74	2+	6.8	21	3.0	4.0
BR6475-2	174	96	71	3+	6.8	24	2.8	3.6
BR6486-1	256	89	74	3	6.2	17	3.0	4.0
BR6491-1	242	90	85	3+	7.4	17	2.4	2.5
BR6491-5	196	78	81	2	7.0	14	2.8	3.0
BR6491-6	220	95	73	3	7.4	15	2.4	4.3
B 6044-14	282	93	72	3+	7.0	11	3.0	3.0
B 6097-9	346	93	70	4	7.0	13	3.0	4.4
B 6139-11	307	92	73	3+	7.4	25	2.0	4.1
B 6518-2	245	86	78	3	6.4	30	2.0	3.5
B 6518-4	307	89	67	3	7.8	17	2.6	5.0
B 6518-8	260	89	78	3+	8.6	18	3.0	3.3
B 6563-2	209	90	78	2+	6.8	16	2.4	3.4
B 6595-12	172	90	74	2+	7.8	23	1.4	2.9
B 6603-6	282	93	75	3+	6.8	22	3.0	3.1
B 6603-12	210	77	82	2	7.4	22	2.0	3.0
Kennebec	318	95	64	3+	6.8	25	3.0	4.4
Norchip	256	83	78	2+	6.8	10	2.2	3.9
Peconic	277	86	72	3	7.0	10	2.8	4.0
Raritan	236	89	75	3	7.2	14	3.0	3.1
R. Burbank	195	64	71	1+	8.0	20	3.0	4.0
Seminole	269	94	83	3	7.4	18	2.4	2.9
Mean	253	88	75		7.1	18	2.7	3.6
ISD (.05)	48		3		0.7	8	0.4	0.6
(.01)	64		4		0.9	10	0.5	0.8
C.V.- %	15.2		3.6		7.6	32.7	11.0	15.5

1/ 1.0 deleted

2/ Refer to footnotes of Table 1.

3/ Refer to footnotes of Table 4.

Table 7. Field performance and processed quality evaluation of potato varieties and selections grown at Shirley, New Jersey, 1970

Pedigree	Tuber Appear. ^{1/}	S. G. ^{1/}	Yield over 2 ins.		Air Pol- lution Injury ^{2/}	Mash Tex- ture
			Cwt./acre	Percent		
BR5948-1	3+	84	314	86	3	2.8
BR5960-5	3	62	231	85	3	4.8
BR5967-7	2+	86	349	92	5	2.0
B6044-14	3	87	289	88	3	2.8
B6097-9	3+	82	344	77	4	3.2
B6139-11	4	92	253	74	5	1.6
BR6290-3	3+	74	252	75	5	3.2
BR6316-4	3	78	398	91	4	2.8
BR6316-7	3	88	308	84	5	1.6
BR6320-1	3	70	217	79	3	3.8
BR6463-2	3	78	277	78	4	3.0
BR6486-1	2	69	242	82	4	4.6
B6518-2	3+	72	274	80	2	3.6
B6563-2	3	72	202	77	3	3.0
B6587-8	4	77	209	80	5	3.4
B6603-6	4	85	342	92	5	1.6
B6603-12	3+	85	321	77	3	1.2
BR6863-2	3+	79	358	95	5	2.6
Chippewa	3+	64	326	87	5	4.6
B5141-6	4	91	317	83	3	1.2
Katahdin	4	65	310	91	4	4.4
Kennebec	2	72	274	78	4	3.4
Norchip	2+	73	329	85	2	2.8
Superior	2+	68	261	93	4	4.4
Mean		77	292	84		3.0
LSD (.05)		5	47	6		3.7
(.01)		6	63	8		1.0
C.V.- %		4.8	12.9	5.9		19.4

1/ Refer to footnotes Table 1.

2/ Rating 1-5, 1 = very susceptible reaction - numerous lesions of all sizes over nearly entire plant accompanied by leaf chlorosis and defoliation. 5 = very resistant reaction - only an occasional leaf with minute lesions, no leaf chlorosis or defoliation.

3/ Rating 1-5, 1 = mealy, dense, 5 = thin, watery, sticky. (a rating of 3.0 is considered acceptable.)

Table 8. Field performance and processed quality evaluation of potato varieties and seedlings grown in Trial I at Ebensburg, Perma., 1970

Pedigree	Tuber Appear. ^{1/}	S. G. ^{1/}	Yield over 2 ins.		French fry		Mash Tex- ture ^{3/}
			Cwt./acre	Per cent	Color ^{2/}	Tex- ture ^{2/}	
BR5948-1	4	85	243	93	2.8	2.9	-
BR5960-5	4	76	296	92	2.6	3.6	1.5
BR5967-7	4+	83	315	96	2.8	3.5	2.8
B6044-14	4+	79	273	93	2.8	3.2	-
B6097-9	4+	78	240	80	2.4	4.3	-
B6139-11	3+	79	337	92	2.4	4.0	-
BR6290-3	3	77	305	91	2.8	4.0	-
BR6316-4	3+	74	287	93	2.6	3.9	-
BR6316-7	2+	82	327	91	3.0	3.7	1.4
BR6320-1	4	76	194	78	2.2	3.5	2.2
BR6442-1	3	73	259	91	3.0	3.7	1.9
BR6463-2	3	75	270	91	2.2	4.0	2.9
BR6486-1	3	68	179	74	2.8	4.9	-
ND5761-5	3	78	179	90	2.6	4.0	1.8
ND6925-13	2+	76	270	85	3.0	3.1	2.1
ND7103-4	3	72	224	87	2.4	4.2	3.2
G 597-20	3	78	275	92	3.0	4.3	2.2
6 CX-6	3+	78	346	93	2.0	3.8	2.1
Kennebec	3	77	389	95	2.2	3.7	1.8
B5141-6	3+	90	233	91	1.2	2.9	2.2
R. Burbank	2	84	298	79	2.6	2.3	1.7
Mean		78	273	89	2.5	3.7	2.1
LSD (.05)		3	43	5	0.5	0.7	0.6
(.01)		4	58	7	0.7	0.9	0.8
C.V. - %		2.9	11.2	4.1	15.5	14.2	22.8

1/ Refer to footnotes Table 1.

2/ Refer to footnotes Table 4.

3/ Refer to footnotes Table 7.

Table 9. Field performance and processed quality evaluation of potato varieties and seedlings grown in Trial II at Ebensburg, Penna., 1970

Pedigree	Tuber Appear. ^{1/}	S. G. ^{1/}	Yield over 2 ins.		French fry		Mash Tex- ture ^{3/}
			Cwt./acre	Per cent	Color ^{2/}	Tex- ture ^{2/}	
B6516-27	3+	73	283	92	2.8	4.6	-
B6518-2	3	73	197	84	1.8	3.9	-
B6518-4	2	76	360	94	2.6	4.1	2.4
B6518-5	3	80	293	91	2.4	3.7	-
B6518-8	4+	78	216	85	2.2	3.7	3.3
B6537-4	3+	74	294	94	3.0	3.6	-
B6563-2	4+	74	202	87	2.8	4.2	-
B6564-27	4	81	234	92	1.6	3.9	-
B6567-12	3	73	325	93	3.0	3.6	4.2
B6587-8	3	78	289	90	3.0	4.0	3.6
B6595-5	4	80	347	93	2.4	4.2	3.4
B6595-12	3+	94	148	80	1.2	2.9	1.5
B6603-6	4	85	277	95	2.2	2.2	1.2
B6603-12	3+	83	279	83	1.6	3.0	1.0
I. Cobbler	2	69	226	86	3.0	4.1	-
Kennebec	3+	74	320	96	2.0	3.9	2.7
B5141-6	4	88	244	90	1.2	3.4	2.2
Norchip	3	80	292	89	2.2	4.2	1.7
Raritan	2+	93	352	95	3.0	2.7	1.5
R. Burbank	2+	86	257	79	2.6	2.3	1.6
Mean		80	309	90	2.3	3.6	2.3
LSD (.05)		3	53	5	0.6	0.7	0.6
(.01)		4	71	6	0.7	0.9	0.8
C.V. - %		3.2	15.3	4.3	19.0	15.5	20.0

1/ Refer to footnotes Table 1

2/ Refer to footnotes Table 4

3/ Refer to footnotes Table 7

Long Island Vegetable Research Farm, Riverhead, New York

S. Dallyn, P. Schippers and D. Fricke

Methods

Nine varieties were placed in a trial to obtain information on yield and ability to stand up during marketing in an immature condition.

All varieties were planted April 9 at a spacing of 8 to 9". Fertilization consisted of 2250 lb/A 8-16-8 banded at planting plus 40 lbs N topdressed on cover crop the previous fall.

The experimental design was a split plot; primary plots (harvest) 3 rows x 300', secondary plots (variety) single row x 30'. Primary plots were replicated four times.

Harvest. The following four treatments were involved:

1. Vines rotocut and sprayed with sodium arsenite 7/20;
harvested 7/29,
2. Vines rotocut and harvested 7/29,
3. Vines rotocut and sprayed with sodium arsenite 7/29;
harvested 8/5,
4. Vines rotocut and harvested 8/5.

Post Harvest Handling. Two samples from all variety-harvest treatments were taken; one was washed, the other not. These were placed in 10-lb. vent-view paper bags and kept in storage at high temperature and humidity (approximately 75-80 F, 95% R.H.) for 5 days. At the end of that time they were checked for incidence of soft rot infection. Specific gravity and black spot (125 gram dropped 30 cm, temperature 10°C) determinations were made on all plots.

Results

The yield data are presented in Tables 1 and 2 and the remainder of the information in Tables 3 and 4. Vine killing ahead of harvest reduced yield and specific gravity but improved skin set and keeping quality. Superior, Haig, Norgold, and Alamo, performed well; Abnaki and Norchip showed some promise as well.

Varieties and sources are listed below:

- | | |
|-----------------------|----------------------|
| 1. Abnaki | Maine Seed Board |
| 2. Chippewa | D. Johnston, Maine |
| 3. Norchip | Thompson, N.D. |
| 4. Alamo | Reed, Maine |
| 5. Superior | R. Roofe, Maine |
| 6. Onaway | F. Reisner, Michigan |
| 7. Norgold | Ryan, N.D. |
| 8. Haig | Shaver, Nebraska |
| 9. Peconic | D. Young, New York |

Table 1. Effect of killing and harvest dates on yield of potatoes, Cwt/A.

Variety	Kill 7/20 Harvest 7/29			Kill and Harvest 7/29			Kill 7/29 Harvest 8/5			Kill and Harvest 8/5		
	2-3 $\frac{1}{2}$ "	"B"	Jumbo	2-3 $\frac{1}{2}$ "	"B"	Jumbo	2-3 $\frac{1}{2}$ "	"B"	Jumbo	2-3 $\frac{1}{2}$ "	"B"	Jumbo
Abnaki	260	17	17	335	25	23	335	20	23	372	18	33
Chippewa	225	20	5	295	26	6	314	24	16	332	24	24
Norchip	197	33	5	239	42	3	277	37	0	302	32	8
Alamo	280	28	4	323	29	3	308	27	0	351	27	10
Superior	261	21	1	300	26	0	317	20	1	380	17	0
Onaway	291	23	16	340	23	11	331	29	24	392	19	32
Norgold	166	54	0	242	40	0	210	56	1	240	54	0
Haig	189	60	0	236	64	0	268	62	0	292	49	1
Peconic	195	39	0	248	42	0	258	50	3	282	42	0
LSD 5% 37												

Table 2. Main effects on yield.

Harvest Treatment	2-3 $\frac{1}{2}$ "	"B"	Jumbo
1) Kill 7/20, harvest 7/29	225	33	5
2) Kill, harvest 7/29	279	35	5
3) Kill 7/29, harvest 8/5	289	36	8
4) Kill, harvest 8/5	326	31	12
LSD 5%	30		
<u>Varieties</u>			
Abnaki	325	20	24
Chippewa	291	24	13
Norchip	254	36	4
Alamo	315	28	4
Superior	314	21	1
Onaway	338	26	21
Norgold	215	51	0
Haig	247	59	0
Peconic	246	43	1
LSD 5%	20		

Table 3. Effect of dates of vine killing and harvest on skinning, specific gravity, black spot, and keeping quality of potatoes.

Kill 7/20-Harvest 7/29						Kill,harvest 7/29					
Skinning	Gravity	Black Spot	% Rot			Skinning	Gravity	Black Spot	% Rot		
			Washed	Dry					Washed	Dry	
1.	2.9	1.0587	1.63	3.5	0	3.5	1.0656	2.35	8.1	0	
2.	3.1	.0533	2.16	6.4	1.0	3.7	.0584	2.22	13.6	4.7	
3.	2.2	.0688	2.56	5.4	0	2.9	.0748	2.61	10.5	2.9	
4.	2.4	.0524	1.90	3.9	1.1	2.9	.0607	2.25	4.9	1.8	
5.	2.0	.0627	2.48	1.9	0	2.1	.0700	2.57	0.9	0	
6.	3.0	.0544	1.97	6.4	0	3.5	.0632	2.37	15.4	0	
7.	2.2	.0613	2.68	-	0	3.1	.0670	2.75	3.9	0	
8.	1.6	.0613	2.13	2.1	0	3.0	.0699	2.18	2.8	0	
9.	2.2	.0636	2.39	4.1	0	3.2	.0750	2.59	8.9	0.9	
Kill 7/29-Harvest 8/5						Kill,harvest 8/5					
1.	2.9	1.0661	2.71	0	0	2.9	1.0681	2.44	1.6	0	
2.	2.9	.0588	2.81	0	0	2.9	.0621	2.85	0	0	
3.	2.2	.0723	2.61	1.8	0.5	2.6	.0733	2.61	1.0	0	
4.	2.0	.0618	2.22	1.1	0.3	2.0	.0608	2.60	0	0	
5.	1.6	.0683	2.91	0	0	2.1	.0687	3.17	1.3	0	
6.	2.7	.0623	2.55	0	0	3.0	.0660	3.34	1.3	0	
7.	1.9	.0648	3.06	0	0	2.5	.0654	3.04	1.6	0	
8.	1.7	.0665	2.57	0.4	0.1	2.6	.0684	2.40	0	0	
9.	2.6	.0721	3.14	0.7	0.2	2.9	.0757	3.27	0.8	0	

Table 4. Main effects from Table 3.

Harvest Treatment ^{1/}	Skinning	Specific Gravity	Black Spot	% Rot	
				Washed	Dry
1. Kill 7/20, harvest 7/29	2.40	1.0596	2.21	3.7	0.2
2. Kill,harvest 7/29	3.10	.0672	2.43	7.7	1.1
3. Kill 7/29, harvest 8/5	2.28	.0659	2.73	0.4	0.1
4. Kill,harvest 8/5	2.61	.0676	2.86	0.8	0
Varieties ^{1/}	Skinning	Specific Gravity	Black Spot	% Rot	
				Washed	Dry
1. Abnaki	3.05	.0646	2.28	3.3	0
2. Chippewa	3.15	.0582	2.51	5.0	1.4
3. Norchip	2.48	.0723	2.60	4.7	0.9
4. Alamo	2.33	.0589	2.24	2.5	0.8
5. Superior	1.95	.0674	2.78	1.0	0
6. Onaway	3.05	.0615	2.56	5.8	0
7. Norgold	2.43	.0646	2.88	1.4	0
8. Haig	2.23	.0665	2.32	1.3	0
9. Peconic	2.73	.0716	2.85	3.6	0.3

^{1/} Highly significant effects of treatments and varieties on both specific gravity and black spot.

NEW YORK (Long Island)
S. Dallyn, P. Schippers and D. Fricke

Methods

Planted 4-10-70, 9" spacing
Fertilized with 2250 lbs/A 8-16-8, plus 40 lbs N on cover crop the previous fall.
Plots 1 row x 30', 5 replications
Vines killed 9/2, harvested 9/14.

After curing at room temperature for 7 days, samples were placed in storage at 40°, 45°, 50° and 65°F. Black spot and specific gravity were determined at this time as well. Data were taken on the number of tubers which showed shattering around the impact area in the black spot procedure. This is probably some indication of the "durability" of a variety during handling.

New York Table 1. Long Island Vegetable Research Farm, Riverhead, New York, Potato Variety Trial - 1970

		Yield - Cwt/Acre			% Jumbo	% Stand	Appearance	1/ Specific Gravity	Black		% Shatter
		2-3	1 1/2"	"B" Cull					Spot Index	2/ Index	
1.	NY 41 - Cornell	275	9	0	317	10	87	3.2	.0672	3.18	0
2.	NY 45 - Cornell	348	13	18	156	24	82	3.2	.0715	3.34	18
3.	Cascade - Maine Seed Board	448	17	16	54	2	89	3.6	.0654	1.93	16
4.	NY 40 - Cornell	334	12	30	159	2	89	3.0	.0669	2.49	30
5.	Abnaki - Maine Seed Board	353	9	10	128	32	82	3.5	.0632	2.28	10
6.	Raritan - Maine Seed Board	416	18	0	56	55	84	3.7	.0812	2.39	0
7.	NY 43 - Cornell	356	18	24	70	54	84	3.2	.0683	2.02	24
8.	BR6820-29 - Maine Seed Board	408	40	1	8	60	84	3.7	.0667	2.95	1
9.	B6741-16 - Maine Seed Board	327	15	23	72	18	87	3.5	.0568	1.88	23
10.	Katahdin - Cornell	348	14	1	48	2	89	3.5	.0588	2.75	1
11.	Mauseon - Maine Seed Board	335	17	0	61	24	89	3.0	.0591	2.23	0
12.	Reliance - Maine Seed Board	342	13	26	53	4	87	3.7	.0598	2.04	26
13.	NY 38 - Cornell	245	8	0	131	2	84	3.1	.0693	3.32	0
14.	B6879-11 Maine Seed Board	316	16	6	50	20	84	3.3	.0618	1.88	6
15.	Sable - Maine Seed Board	329	11	14	32	5	89	3.6	.0535	2.60	14
16.	Peconic - Cornell	351	37	0	10	5	92	3.4	.0693	3.60	0
17.	B6887-6 - Maine Seed Board	343	44	49	7	0	87	1.6	.0460	1.50	49
18.	Peconic - N.Y. (Dave Young)	331	34	0	1	0	92	3.4	.0706	3.62	0
19.	B6751-3 - Maine Seed Board	312	34	12	8	30	87	3.2	.0555	3.12	12
20.	B6741-11 - Maine Seed Board	312	12	4	8	7	82	4.1	.0611	2.66	4
21.	Katahdin - Maine (W.Flewelling)	289	18	6	19	0	87	3.4	.0573	2.31	6
22.	B6741-22- Maine Seed Board	274	50	3	3	0	84	3.1	.0583	2.75	3
23.	B6799-1 - Maine Seed Board	229	52	57	0	0	89	3.3	.0524	2.33	57
24.	B6750-11 - Maine Seed Board	227	85	0	1	0	84	3.0	.0658	3.46	0
25.	B6741-3 - Maine Seed Board	203	17	41	1	0	87	3.7	.0609	3.10	41

1/ 1-poor, 5-excellent

2/ 1-none, 5-severe

3/ tubers showing cracks in the impact area in black spot determination

New York Table 2. Long Island Vegetable Research Farm, Riverhead, New York Potato Variety Trial - 1970

Varieties	Comments	% Sprouting				Comments
		50 F	65 F	11/8	12/1	
1. NY 41	Round, medium depth eye; too large in size at this harvest date.	0	20	0	0	(65 F 12/1)
2. NY 45	Mostly round, f. deep apical eye; some netting. Many jumbos at this harvest date.	0	0	0	20	---
3. Cascade	Elong. bright skin, shallow eye.	0	20	40	80	1/2 cm
4. NY 40	Round w/some oblong; f. deep eye; netted. Too large at harvest date.	0	10	25	50	eye activity
5. Abnaki	Round, sli. net, shallow eye.	0	70	75	90	1/4 cm
6. Raritan	Round, some pear shape, netted, shallow eye.	30	50	60	70	up to 1-1/2 cm
7. NY 43	Round, medium depth eyes, slightly netted.	0	0	50	75	eye activity
8. BR6820-29	Round, small, netted, shallow eye, uniform shape.	30	60	75	90	1 cm
9. B6741-16	Smooth, elongated, shallow eye.	0	80	20	80	eye activity
10. Katahdin (NY)	Shallow eye, bright, fair amount of skinning.	0	30	25	60	eye activity
11. Wauseon	Irregular shape, deep apical eye, netted.	0	30	70	70	eye activity
12. Reliance	Round, shallow eye, netted.	0	10	10	50	eye activity
13. NY 38	Round, rough, deep eye, netted. V. large. Would require earlier harvesting to control proportion of jumbos.	0	0	0	0	---
14. B6879-11	Round, fairly deep apical eye, slight net.	20	40	65	100	1/2 cm
15. Sable	Elongated, shallow eye, bright skin.	0	40	60	80	1/4 cm
16. Peconic (NY)	Round, netted, deep apical eyes, uniform.	0	0	10	50	eye activity
17. B6887-6	Severe rot in field, many growth cracks.	0	0	0	20	---
18. Peconic (Young)	Round, netted skin, fairly deep apical eyes	0	0	0	0	---
19. B6751-3	Severe skinning, round, shallow eye, med. size	0	30	85	100	3/4 cm
20. B6741-11	Oblong, shallow eye, bright skin.	0	50	90	100	1/2 cm
21. Katahdin	Some skinning, good shape.	0	20	40	100	eye activity
22. B6741-22	Oblong, bright skin, shallow eye.	60	75	90	100	1/2 cm
23. B6799-1	Small, round, netted skin, shallow eye.	70	90	100	100	2 cm
24. B6750-11	Variable shape and color (net).	30	90	90	90	1-1/2 cm
25. B6741-3	Oblong, bright skin, shallow eye, small.	40	100	90	100	1/4 cm

1/ Tubers shrivelled

NEW YORK (Long Island)
R. C. Cetas

Evaluation of Potato Varieties and Breeding
Lines for Resistance to Verticillium Wilt
On Long Island in 1970

A 4-phased field program was conducted to evaluate potato varieties and breeding lines for Verticillium wilt resistance on Long Island. The separate phases of the program were as follows: Phase I, 1- to 3-hill (usually from a single tuber) nonreplicated plots of recently developed breeding lines; Phase II, 5-hill nonreplicated plots of selections from Phase I of the previous year; Phase III, 20-hill nonreplicated plots of selections from Phase II of the previous year, certain selections of Phase III of the previous year, and selections from the U.S.D.A. potato breeding program; and Phase IV, replicated 20-hill plots of selections from Phases III and IV of the previous year and selected named varieties. In Phases I, selections were made on the basis of plant symptoms to the disease. In the other 3 phases, yield and other horticultural characteristics were considered, also. The primary source of the breeding lines for evaluation was the Cornell University potato breeding program. Advanced selections from the U.S.D.A. potato breeding program, however, were evaluated in Phases III and IV.

Methods and Materials

In 1970, 1152 entries were included in Phase I, 202 in Phase II, 29 in Phase III, and 29 in Phase IV. The seedpieces were cut and treated with 8% zinc ion-maneb dust between March 26 and March 30. The seedpieces were stored at 55 to 60°F until planted. The breeding lines in Phase I were planted on April 15 and 16, and in Phases II, III and IV on April 14. The hills were spaced 12 inches apart in the row and the rows were approximately 34 inches apart. The grower-cooperator fertilized and marked the rows with his potato planter on April 14, and the seedpieces were planted with a hand planter. All other cultural practices were those employed by the grower-cooperator in the production of his commercial potato crop. The light Sassafras loam was naturally infested with Verticillium dahliae, Pratylenchus penetrans, and other organisms that may be associated with Verticillium wilt on Long Island.

Observations on plant growth and vine condition were made periodically during the growing season. On August 12, the breeding lines and named varieties were rated 1 to 7 for vine condition. The system used was as follows: 1 - plants normal or nearly so, 2 - slight bronzing and wilting of the foliage, 3 - 60 to 90% of the foliage green, 4 - 40 to 60% of the foliage green, 5 - 20 to 40% of the foliage green, 6 - trace to 20% of the foliage green, and 7 - all plants dead. All selections and varieties with a vine score of 5 or less were considered to possess resistance to Verticillium wilt.

The breeding lines and varieties in Phases II, III and IV were harvested on September 14. All tubers harvested were counted, weighed, and sized on a grader equipped with a 2-inch chain. All size A tubers (tubers that passed over the 2-inch grader chain) were washed and examined for growth cracks and knobs. Forty size A tubers, or all size A tubers if less than 40 were available, from each plot were examined for pinkeye, stemend vascular browning, hollow heart and internal necrosis. Pinkeye was scored as follows: 0 - none, 1 - lesions confined to the eyes, 2 - lesions extended beyond the eyebrows but not coalesced, 3 - lesions coalesced at apical end of tuber and/or secondary rot initiated, and 4 - lesions from apical eyes coalesced with those lower on the tuber and/or secondary rot progressed into flesh of the tuber. Stemend vascular browning was scored in a cross-sectional plane 1/8-to 1/4-inch above the stolon attachment. The scoring system used was as follows: 0 - none, 1 - trace of brown, 2 - 1 to 6% of the vascular ring brown, 3 - 6 to 12% of the vascular ring brown, 4 - 12 to 25% of the vascular ring brown, 5 - 25 to 50% of the vascular ring brown, and 6 - 50% or more of the vascular ring brown. The pinkeye and stemend vascular browning scores for each breeding line or variety was obtained by dividing the sum of the individual tuber scores by the number of affected tubers. A potato hydrometer was used to determine specific gravity of an 8-pound sample of tubers from each plot.

The vine score, yield, and percent tubers with stemend vascular browning data from the replicated variety trial (Phase IV) were subjected to the analysis of variance. Percentages were converted to equivalent angles and the transformed data were analyzed. Duncan's multiple range test was used to determine significant differences among means at the 5% level.

Results

An excellent stand of plants was obtained with most breeding lines and varieties. The first symptoms of Verticillium wilt were observed about mid-July. The very susceptible selections and varieties were dead on or before August 12.

The vine condition scores of August 12 indicated that, of the 29 varieties included in the replicated variety trial, Abnaki, Cariboo, Houma, NY-30, NY-45, NY-46, NY-47, F12-61, F21-14, F21-19, F289-11, H394-5, and H413-5 were either as or more resistant to Verticillium wilt than Katahdin. The plants of Ona and of NY-47 were still green when the plots were rotobated on September 8. The selections and varieties that produced total yields of 300 or more CWT per acre included Abnaki, Houma, Peconic, B6376-6, NY-6, NY-30, NY-45, NY-48, F21-14, F21-19, F289-11, F399-4, H394-5, and H413-3. In contrast the average total yield was 281 CWT/A for Katahdin, 204 for Kennebec, and 197 for Wauseon. Although 14 of the 29 varieties produced 300 or more CWT per acre, several had one or more undesirable horticultural characteristics (Tables 1 and 2).

Ten of the 29 selections included in Phase III (20-hill, nonreplicated) produced 300 or more CWT of tubers per acre. Seven of the high yielding selections had a vine condition score of 5 or less on August 12 (Tables 3 and 4). Thirty-eight of the 202 breeding lines included in Phase II (5-hill, nonreplicated) produced 9.5 or more pounds (approximately 300 CWT/A) of size A tubers (2-inch minimum) per plot but many of these had one or more unsatisfactory horticultural characteristics. Approximately 285 of the 1152 breeding lines included in Phase I had a vine condition score of 5 or less on August 12.

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Table 1. Percent stand, vine score, and yield of various varieties of potatoes grown in soils naturally infested with the organisms associated with Verticillium wilt on Long Island in 1970 (4 replicates, 20 hills, 12-inch spacing).

Variety ^{1/}	Percent stand 5/28	Vine score 8/12	Yield per acre		No. of tubers/hill	
			Total	2-inch minimum	Total	2-inch minimum
			CWT	Percent		
Abnaki	100	5.0 ^{efg}	289 ^{d-i}	274 ^{d-i}	5.32 ^{a-g}	4.70 ^{c-h}
Abnaki ^{2/}	100	4.2 ^{cde}	364 ⁱ	344 ⁱ	6.68 ^{h-m}	5.75 ^{hi-j}
Cariboo ^{3/}	99	4.0 ^{cde}	254 ^{a-d}	203 ^{a-d}	7.35 ^{k-n}	4.55 ^{c-h}
Chippewa ^{2/}	98	6.5 ^{ghi}	215 ^{ab}	194 ^{abc}	4.90 ^{a-e}	3.95 ^{a-d}
Houma	100	3.2 ^{bc}	346 ^{hi}	306 ^{f-i}	8.05 ⁿ	6.12 ^{ij}
Houma ^{2/}	100	4.8 ^{def}	329 ^{e-i}	282 ^{e-i}	7.78 ^{mn}	5.65 ^{ij}
Katahdin	100	5.5 ^{fgh}	286 ^{c-h}	262 ^{c-h}	5.58 ^{a-i}	4.68 ^{c-h}
Katahdin	96	4.2 ^{cde}	277 ^{b-h}	254 ^{c-g}	5.65 ^{b-i}	4.58 ^{c-h}
Kennebec ^{2/}	100	6.8 ⁱ	204 ^a	175 ^{ab}	4.52 ^a	3.02 ^a
Ona ^{2/}	100	3.0 ^b	259 ^{a-e}	224 ^{a-e}	6.12 ^{e-k}	4.05 ^{a-e}
Peconic	94	5.8 ^{f-i}	300 ^{d-i}	273 ^{d-i}	7.48 ^{lmn}	6.08 ^{ij}
Wauseon	98	6.8 ⁱ	197 ^a	168 ^a	4.60 ^a	3.38 ^{ab}
B6376-62 ^{2/}	98	5.8 ^{f-i}	345 ^{ghi}	334 ^{hi}	6.10 ^{e-k}	5.25 ^{f-i}
NY-6	100	6.0 ^{f-i}	443 ^j	424 ^j	7.62 ^{mn}	6.80 ^j
NY-30	98	4.0 ^{cde}	302 ^{d-i}	290 ^{e-i}	4.72 ^{a-d}	4.28 ^{b-f}
NY-41	100	5.8 ^{f-i}	294 ^{d-i}	274 ^{d-i}	5.40 ^{a-g}	4.52 ^{c-g}
NY-45	100	3.8 ^{bcd}	328 ^{e-i}	304 ^{f-i}	6.25 ^{f-l}	5.08 ^{d-i}
NY-46	99	3.5 ^{bc}	283 ^{b-h}	259 ^{c-h}	6.15 ^{f-k}	5.12 ^{e-i}

Table 1. (Continued)

Variety ^{1/}	Percent stand 5/28	Vine score 8/12	Yield per acre		No. of tubers/hill	
			Total CWT	2-inch minimum ^{4/} Percent	Total	2-inch minimum
NY-47	98	2.0 ^a	291 ^{d-i}	71.3 ^{a-d}	6.80 ⁱ⁻ⁿ	4.90 ^{d-i}
NY-48	99	6.2 ^{ghi}	335 ^{f-i}	87.3 ^{h-n}	5.85 ^{d-i}	5.20 ^{e-i}
F9-31	99	5.8 ^{f-i}	291 ^{d-i}	85.7 ^{g-n}	5.78 ^{b-i}	4.95 ^{d-i}
F12-49	100	5.5 ^{fgh}	273 ^{b-h}	77.4 ^{c-h}	6.58 ^{g-m}	5.10 ^{e-i}
F12-53	95	6.5 ^{hi}	272 ^{b-g}	90.4 ^{lmn}	5.05 ^{a-f}	4.50 ^{c-g}
F12-61	99	4.2 ^{cde}	292 ^{d-i}	85.3 ^{g-n}	5.42 ^{a-h}	4.60 ^{c-h}
F21-14	99	3.2 ^{bc}	343 ^{f-i}	87.0 ^{h-n}	6.08 ^{e-k}	5.32 ^{f-i}
F21-19	100	3.6 ^b	299 ^{d-i}	67.1 ^{abc}	7.15 ^{j-n}	4.78 ^{c-h}
F289-11	99	3.8 ^{bcd}	333 ^{f-i}	84.1 ^{f-n}	5.72 ^{b-i}	4.78 ^{c-h}
F293-10	95	5.5 ^{fgh}	217 ^{abc}	83.4 ^{e-m}	4.52 ^a	3.78 ^{abc}
F399-4	100	6.0 ^{f-i}	327 ^{d-i}	78.1 ^{c-h}	7.40 ^{k-n}	5.75 ^{hi-j}
G77-1	100	7.0 ⁱ	271 ^{b-f}	92.6 ⁿ	4.62 ^{abc}	4.20 ^{b-f}
H394-5	100	3.2 ^{bc}	308 ^{d-i}	79.4 ^{d-i}	5.20 ^{a-f}	4.15 ^{b-f}
H413-5	100	4.8 ^{def}	302 ^{d-i}	85.9 ^{g-n}	5.80 ^{c-i}	4.98 ^{d-i}

- ^{1/} Unless otherwise indicated, the source of the seed potatoes was Cornell University, Ithaca, New York.
- ^{2/} Seed potatoes obtained from USDA, ARS, Plant Science Research Division, Beltsville, Maryland.
- ^{3/} Seed potatoes obtained from Canada Department of Agriculture, Research Branch, Research Station, Fredericton, New Brunswick.
- ^{4/} Based on number of tubers.

Table 2. Specific gravity and percentage of tubers with various defects when various varieties of potatoes were grown in soils that were naturally infested with the organisms associated with Verticillium wilt on Long Island in 1970 (4 replicates, 20 hills, 12-inch spacing).

Variety ^{1/}	Specific gravity ^{2/}	Stemend					Growth cracks	Internal necrosis	Knobs
		Pinkeye ^{3/} %	browning ^{4/} %	Hollow heart	Score	Score			
Abnaki	698 ^{i-l}	0.0	0.0	2.5	1.1	24 ^{a-e}	0.8	0.0	0.5
Abnaki ^{4/}	702 ^{jkl}	0.0	0.0	3.1	1.3	24 ^{a-e}	0.2	0.0	0.9
Cariboo ^{5/}	785 ^{op}	0.0	0.0	0.0	2.5	72 ^{l-o}	0.3	0.0	0.0
Chippewa ^{4/}	570 ^a	1.2	1.5	0.6	1.3	55 ^{i-l}	1.0	0.6	0.0
Houma	705 ^{jkl}	0.6	1.0	0.6	1.2	20 ^{abc}	0.6	1.9	2.0
Houma ^{4/}	712 ^{j-m}	1.2	1.0	0.6	1.3	30 ^{b-f}	0.0	1.2	3.6
Katahdin	575 ^{ab}	3.8	1.7	0.0	2.9	90 ^o	0.3	0.0	0.3
Katahdin	608 ^{b-e}	6.2	2.0	0.6	3.1	80 ^{no}	0.3	0.0	0.0
Kennebec ^{4/}	590 ^{a-d}	48.6	2.4	8.9	2.4	79 ^{mno}	0.8	2.0	2.5
Ona ^{4/}	658 ^{ghi}	0.0	0.0	1.2	2.0	24 ^{a-e}	0.6	1.9	2.8
Peconic	738 ^{lmn}	1.9	1.0	0.0	1.7	57 ^{i-l}	0.0	0.0	0.2
Wauseon	620 ^{d-g}	3.1	2.4	1.9	1.8	66 ^{k-n}	4.6	0.0	2.3
B6376-6 ^{4/}	652 ^{fgh}	0.0	0.0	0.6	1.8	25 ^{a-e}	1.0	0.0	1.5
NY-6	618 ^{c-f}	1.2	1.0	1.9	1.6	54 ^{i-l}	3.3	0.0	1.5
NY-30	710 ^{j-m}	1.2	1.5	11.2	1.8	51 ^{g-l}	3.9	0.6	1.2
NY-41	642 ^{efg}	20.0	1.5	0.0	1.8	48 ^{f-k}	0.6	2.5	1.4
NY-45	722 ^{j-n}	0.6	1.0	3.1	1.3	33 ^{c-h}	1.7	0.0	1.0
NY-46	685 ^{hij}	1.2	1.0	0.0	1.5	44 ^{e-j}	0.0	9.4	3.7

Table 2. (Continued)

Variety	1/ Specific gravity	2/ Pinkeye %	3/ Score	Stemend browning %	3/ Score	Hollow heart	Growth cracks	Internal necrosis	Knobs
NY-47	758 ^{nop}	0.6	1.0	59 ^{j-m}	1.8	0.0	0.8	10.6	1.3
NY-48	630 ^{efg}	1.2	2.0	58 ^{i-m}	1.3	0.0	3.9	3.1	0.7
F9-31	755 ^{nop}	1.3	1.0	41 ^{d-i}	1.4	3.2	0.0	0.6	1.3
F12-49	735 ^{k-n}	0.0	0.0	15 ^{ab}	1.2	0.0	0.7	0.0	0.7
F12-53	748 ^{mno}	0.0	0.0	22 ^{a-d}	1.2	1.2	0.0	0.0	0.9
F12-61	790 ^p	0.0	0.0	24 ^{a-d}	1.3	3.1	2.0	0.0	0.8
F21-14	710 ^{j-m}	0.0	0.0	32 ^{b-g}	1.4	0.0	0.0	8.8	0.0
F21-19	735 ^{k-n}	0.6	2.0	38 ^{c-i}	1.8	8.8	0.3	0.0	4.4
F289-11	695 ^{ijk}	0.6	1.0	33 ^{b-g}	1.4	0.0	1.3	1.2	9.0
F293-10	582 ^{abc}	0.0	0.0	43 ^{e-j}	1.8	0.0	2.1	0.0	1.0
F399-4	630 ^{efg}	0.0	0.0	9 ^a	2.0	2.5	0.6	33.1	0.2
G77-1	638 ^{efg}	23.1	2.0	89 ^o	2.8	8.1	3.0	0.0	0.9
H394-5	710 ^{j-m}	0.0	0.0	53 ^{h-l}	1.6	0.0	7.7	0.0	3.1
H413-5	650 ^{fgh}	0.0	0.0	23 ^{a-d}	1.2	0.0	1.3	4.4	0.5

1/ See footnote 1, Table 1.

2/ 1.0 omitted from all specific gravity readings.

3/ Average score of affected tubers.

4/ See footnote 2, Table 1.

5/ See footnote 3, Table 1.

Table 3. Percent stand, vine score, and yield of various varieties of potatoes grown in soils naturally infested with the organisms associated with Verticillium wilt on Long Island in 1970 (nonreplicated, 20 hills, 12-inch spacing).

Variety	Percent stand 5/28	Vine score 8/12	Yield per acre		No. of tubers/hill	
			Total CWT	2-inch minimum CWT	Total	2-inch minimum
Cascade	100	5	211	165	4.9	3.0
G59-4	100	3	211	177	4.6	3.2
G91-15	100	5	507	496	6.3	5.8
G94-12	95	6	488	469	8.4	7.5
G164-1	100	3	369	342	6.3	5.1
G481-9	100	4	388	361	7.4	5.9
G542-6	100	4	158	142	3.3	2.6
G573-1	100	3	331	242	10.4	6.0
G689-23	100	6	231	188	6.6	4.3
G698-11	100	7	215	188	5.6	4.2
B5267-2	100	7	231	211	4.8	4.1
B5299-39	100	6	231	211	5.0	4.2
B5408-2	100	7	404	377	7.9	6.4
B5458-6	100	7	135	108	3.4	2.4
B5461-4	100	4	373	361	5.8	5.6
B5647-8	100	7	142	111	4.2	2.8
B5735-5	75	6	54	23	3.1	0.9
B6038-1	95	4	142	100	4.0	2.1
BR6290-9	100	5	234	219	4.8	4.1
BR6442-1	100	7	188	158	5.2	3.8
B6493-14	90	6	142	135	3.2	2.8
B6516-27	100	5	219	204	4.8	4.1
B6529-21	90	5	161	115	5.2	2.8
B6535-10	100	7	150	115	3.8	2.4

Table 3. (Continued)

Variety ^{1/}	Percent stand 5/28	Vine score 8/12	Yield per acre		No. of tubers/hill	
			Total CWT	2-inch minimum CWT	Total	2-inch minimum
B6597-12	100	4	423	381	7.0	6.0
B6591-7	75	4	211	184	5.5	4.7
B6595-5	100	4	388	338	8.7	6.3
B6603-6	100	4	342	327	5.8	5.0
BR6009-7	100	7	188	177	3.2	2.8

^{1/} Source of seed tubers: Cascade - USDA, ARS, Plant Science Research Division, Irrigated Agriculture Research and Extension Center, Prosser, Washington; "G" numbers - Cornell University, Ithaca, New York; "B" and "BR" numbers - USDA, ARS, Plant Science Research Division, Beltsville, Maryland.

^{2/} Based on number of tubers.

Table 4. Specific gravity and percentage of tubers various defects when various varieties of potatoes were grown in soils that were naturally infested with the organisms associated with Verticillium wilt on Long Island in 1970 (nonreplicated, 20 hills, 12-inch spacing).

Variety	1/ Specific gravity	Stemend			Hollow heart	Growth cracks	Internal necrosis	Knobs
		Specific gravity	Pinkeye %	browning % Score 3/				
Cascade	64	2.5	1.0	52	1.5	2.5	0.0	1.6
G59-4	62	3.0	0.0	45	1.9	0.0	2.5	11.1
G91-15	62	5.0	2.5	40	1.4	10.0	5.0	1.7
G94-12	64	2.5	3.0	50	1.6	12.5	5.0	4.2
G164-1	63	0.0	0.0	30	1.4	0.0	0.0	0.0
G481-9	56	15.0	1.3	60	1.2	2.5	2.5	1.7
G542-6	54	17.5	2.9	68	1.9	2.5	0.0	5.8
G573-1	63	2.5	2.0	40	2.3	0.0	2.5	0.0
G689-23	70	0.0	0.0	38	1.6	0.0	0.0	0.0
G698-11	60	0.0	0.0	42	1.7	0.0	0.0	1.2
B5267-2	68	0.0	0.0	2	1.0	0.0	0.0	0.0
B5299-39	62	2.5	1.0	32	1.4	2.5	0.0	1.2
B5408-2	60	0.0	0.0	32	1.4	0.0	0.0	1.6
B5458-6	58	0.0	0.0	28	1.7	2.5	0.0	4.3
B5461-4	70	0.0	0.0	22	1.1	0.0	2.5	0.9
B5647-8	63	0.0	0.0	2	2.0	0.0	0.0	0.0
B5735-5	--	0.0	0.0	29	1.0	0.0	0.0	0.0
B6038-1	74	0.0	0.0	67	2.0	0.0	0.0	7.7
BR6290-9	86	0.0	0.0	78	2.2	30.0	0.0	0.0
BR6442-1	63	2.5	1.0	32	1.1	2.5	0.0	0.0
B6493-14	54	0.0	0.0	42	2.0	0.0	0.0	0.0
B6516-27	71	0.0	0.0	58	2.2	0.0	0.0	0.0
B6529-21	64	10.0	1.5	75	1.5	5.0	57.5	0.0

Table 4. (Continued)

Variety ^{1/}	Specific ^{2/} gravity	Pinkeye %	Stemend browning % ^{3/}	Hollow heart	Growth cracks	Internal necrosis	Knobs
B6535-10	58	0.0	0.0	0.0	0.0	0.0	10.2
B6567-12	68	0.0	0.0	5.0	9.2	2.5	1.7
B6591-7	72	0.0	0.0	2.5	1.4	0.0	1.4
B6595-5	84	0.0	0.0	5.0	0.8	0.0	2.4
B6603-6	84	0.0	0.0	12.5	0.0	0.0	0.0
BR6609-7	69	0.0	0.0	0.0	1.8	0.0	5.4

^{1/} See footnote 1 Table 3 for source of seed tubers.

^{2/} 1.0 omitted from all specific gravity readings.

^{3/} Average score of affected tubers.

NEW YORK
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Results of Chipping Tests

Five tubers from each plot of the 1970 replicated trial and of 14 clones in the nonreplicated trial were stored at 10°C (50°F) on about October 15, 1970. On December 3, 1970, the samples were moved to 18.3 to 21.1°C (65 to 70°F) storage for reconditioning. Between January 4 and 8, 1971, 25 slices from each sample (5 per tuber) were fried for 2.5 minutes in Wesson poly-unsaturated pure vegetable oil at 182°C (360°F) in a double-basket Hotpoint deep-fat fryer. The cross-sectional slices were about 1.25 mm thick (thickness of a dime) and were cut from the mid-section of the tuber. Chip color was rated on a scale of 1 to 10 according to the Potato Chip Color Reference Standard prepared by the Potato Chip Institute International.

Three varieties, Cariboo, Peconic and F9-31, produced chips that had an acceptable color. Chips from 4 other clones, F289-11, F293-10, B6516-27, and B6603-6, were marginal in appearance and may have been acceptable under some conditions (Table 1).

On about October 15, 1970, samples of various varieties and breeding lines were given to a local chipper for immediate evaluation. Their evaluations of the chipability of the various varieties and clones were as follows: Good - Abanaki, NY-48, and F9-31; Fair - Peconic, B5461-4, B6376-6, B6567-12, B6595-5, B6603-6, NY-46, F12-53, F289-11, F293-10, F399-4, G77-1, H394-5, and H413-5; Poor - Cariboo, NY-6, NY-41, NY-45, NY-47, F12-49, F12-61, F21-14, F21-19, G91-15, G94-12, G164-1, G481-9, and B5408-2; Very Poor - NY-30.

New York Table 1. Chip color rating for varieties and clones evaluated for Verticillium wilt resistance on Long Island in 1970.

Variety or clone ^{1/}	Chip color ^{2/}	Variety or clone	Chip color
<u>Replicated Trial</u>			
Abnaki	6.50	NY-45	6.25
Abnaki (USDA)	7.00	NY-46	6.75
Cariboo (Canada)	4.25	NY-47	6.75
Chippewa (USDA)	7.00	NY-48	8.00
Houma	8.25	F9-31	4.25
Houma (USDA)	8.25	F12-49	6.50
Katahdin	6.50	F12-53	6.25
Kathadin (Maine)	6.25	F12-61	5.75
Kennebec (USDA)	7.00	F21-14	6.50
Ona (USDA)	7.25	F21-19	8.00
Peconic	4.50	F289-11	5.00
Wauseon	7.00	F293-10	5.50
B6376-6 (USDA)	6.25	F399-4	6.75
NY-6	7.25	G77-1	6.75
NY-30	6.75	H394-5	6.50
NY-41	6.75	H413-5	7.50
<u>Nonreplicated Trial</u>			
B5267-2 (USDA)	8	B6595-5 (USDA)	6
B5299-39 (USDA)	8	B6603-6 (USDA)	5
B5408-2 (USDA)	8	G91-15	7
B5461-4 (USDA)	7	G94-12	7
BR6290-9 (USDA)	6	G164-1	8
B6516-27 (USDA)	5	G481-9	7
B6567-12 (USDA)	7	G573-1	6

^{1/} Unless otherwise indicated, the source of seed potatoes was the Cornell University Potato Breeding Program.

^{2/} Chip color ratings according to Potato Chip Color Reference Standard prepared by the Potato Chip Institute International. Values for Replicated Trial are averages of 4 replications.

Seedling tuber selection for specific gravity. For the past three years trials were conducted to determine whether the seedling tubers produced in pots in the greenhouse could be separated on the basis of specific gravity to eliminate the lower range without further test. In 1967 and 1968, the second tubers from the greenhouse pots were bulked and then separated by brine solutions. In 1968 and 1969, four tubers from each class were planted as a plot and the production from each plot measured for specific gravity. Some of the tubers separated in 1968 were planted as single hills in 1969 and then their tuber progeny planted as a 10-foot plot in 1970 and measurements taken from these plots. All experiments were planted in a completely randomized design. The results of these trials are given in table 9. It appears that the correlation is not high enough on the lower end of the distribution to warrant the use of mass selection to eliminate the clones with lower specific gravity. On the other hand, if the breeder is seeking only the very highest levels of specific gravity, it appears that this procedure would be quite effective.

Selecting parents on the basis of tuber set, size, or yield. In three succeeding years, the 70 clones in the second-year yield trials at Ithaca and Riverhead were screened for yield 2-1/4", number of tubers 2-1/4", and weight per tuber 2-1/4". These represented 3 different sets of clones. In 1965, crosses were made between the 6 clones selected in 1964 with the largest tubers and the 6 clones with the largest number of tubers. In addition, crosses were made among the 12 highest yielding clones. Duplicate crosses were not included in the analysis. The seedling hills of these progenies provided seed for a progeny trial in 1968. In 1966, crosses between the 1965 selections were of the following types: the 6 largest crosses to the 6 with largest numbers of tubers, among the 12 with the largest number and among the 12 with the largest tubers. Bulk seedling hills were used as planting stock for the progeny trial in 1969. In 1967, the crosses were of the following types: the six largest crossed to the six with the greatest number, among the six largest, among the 6 with greatest number, and among the 12 with highest yield. These progenies were tested in 1970. The characteristics of the parents are given in table 10 and the progeny performance given in table 11. The difference in yield of the progenies were not significant, but neither were the differences among the parents. The data do show that large tuber size can be achieved by selecting at least one high yielding parent with large tubers.

NEW YORK

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The primary objective of the N.Y. breeding program is to produce high yielding varieties with golden nematode and verticillium wilt resistance suitable for table stock use or in processing for chips. The approach to this objective places heavy emphasis upon selection within the andigena germ plasm for adaptation and disease resistance and the production and selection of hybrids with tuberosum clones. These crosses combine segregation for field resistance to late blight, scab, verticillium wilt, virus Y, and golden nematode.

The growing season was generally good until the middle of August when it turned hot and dry. This caused many clones to mature sooner than might be anticipated. The fall was late, but the very wet season delayed the Ithaca harvest.

During the year over 1000 accessions of andigena were obtained from the IR-1, CPC, Colombian, Peruvian, and Ecuadorian collections. Over 40,000 seedling pots were planted in the greenhouses and are presently being harvested. An additional 5000 seedlings of tuberosum parentage were tubered. There were 18,000 seedling hills of tuberosum parentage from which 1423 were selected for further tests. An additional 91 selections were made of tuberosum x andigena hybrids with resistance to late blight and virus Y. From 2500 seedling hills of andigena clones with scab and verticillium wilt resistance, 290 were saved. Approximately 3500 seedling hills of 36 accessions of Chilean tuberosum produced 77 selections. The 1185 first-year, 12-hill plots produced 239 selections. After further reduction on the basis of chip and cooking trials, these will be entered into yield trials in 1970.

The second stage of the selection program begins with the 116 entries included in the first-year yield trial at Ithaca (table 1). Of these, 29 were saved. In the second stage, grown at Riverhead, 5 selections were saved from 14 entries (table 2). In the third year of yield trials, at Ithaca and Riverhead, 11 entries were grown and 4 saved (table 3).

The advanced N.Y. selections were grown at four locations, but circumstances prevented the harvest of one of them. The results of these trials are given in tables 4, 5, and 6. An accumulative summary of the N.Y. selections not yet discarded is given in table 7. The characteristics of the N.Y. clones are given in table 8. In addition to NY-41, the most promising clones are NY-47 for its combination of verticillium wilt and golden nematode resistance and NY-51 for its vernei resistance to the golden nematode. A seed increase was made of NY-41. In 1971, approximately 2 acres will be grown to supply seedstock for planting extensive demonstration plots on Long Island in 1972.

Table 1.
J's - First Year Yield Trial - 1970
4 Replications of 15-foot plots at Ithaca, N.Y.
Selections saved from 116 entries

Pedigree	Total Cwt.	Yield				Specific Gravity		Appear- ^a ance	After Cook. ^b Dark.	40°C ^c Chips		GN ^d	VW ^e	Scab ^f
		>1 7/8"	>2 1/4"	Cwt.	%	1969	1970			2wk.	6wk.			
Katahdin	420	401	95	365	87	1.082	1.080	3.68						
J 18-6	450	426	95	397	88	1.089	1.084	3.00	0 ⁴ ₂	A	A	R	S	S
J 57-3	426	404	95	368	86	1.086	1.078	3.25	0 ² ₁	U	U	R	S	
J 59-10	574	537	94	495	86	1.081	1.072	3.00	0 ¹ ₂	U	I	R	S	S
J 59-11	442	418	95	373	84	1.089	1.086	3.50	0 ¹ ₁	A	A	S	S	S
J 60-1	468	452	97	381	81	1.092	1.086	4.50	0 ¹ ₀	U	U	R	S	S
J 62-6	551	525	95	471	86	1.087	1.075	3.50	0 ³ ₁	I	A	R	S	R3
J 62-11	486	466	96	427	88	1.084	1.081	3.00	0 ³ ₁	I	U	R	R5	
J 63-5	499	466	93	426	85	1.082	1.075	3.00	0 ² ₁	A	A	R	S	S
J 91-4	433	419	97	380	88	1.088	1.081	3.75	0 ¹ ₁	U	A	R		
J 99-5	445	420	94	382	86	1.090	1.086	3.25	1 ³ ₂	A	A	R	R	R2
J102-5	410	390	95	352	86	1.083	1.081	3.00	1 ³ ₂	I	A	R	S	
J107-11	370	348	94	328	89	1.086	1.099	3.25	0 ² ₃			R	R4	
J107-12	438	420	96	396	90	1.093	1.076	3.00	1 ³ ₃	U	I	R	S	
J109-3	450	425	94	396	88	1.090	1.078	3.75	1 ¹ ₁	A	A	R	S	S
J131-2	421	392	93	358	85	1.093	1.085	4.00	1 ² ₁			R	S	
J133-4	431	416	97	386	89	1.083	1.086	4.50	1 ² ₄	U	A	R	S	
J134-1	405	384	95	365	90	1.085	1.082	3.00	0 ⁴ ₄	U	A	R	R4	S
J137-4	381	354	93	331	87	1.089	1.083	4.00	0 ³ ₃	A	A	R	S	S
J137-12	369	344	93	319	86	1.085	1.078	3.25	0 ³ ₁		A	R	R5	S
J147-11	471	444	94	383	81	1.095	1.086	4.00	0 ³ ₁	U	A	R	S	
J153-4	430	405	94	377	88	1.087	1.075	3.50	0 ¹ ₀	U	U	R	R4	R3
J157-2	479	457	95	437	91	1.085	1.076	1.75	0 ¹ ₁	U		R	R3	R2
J246-1	526	487	93	418	79	1.082	1.079	3.00	1 ² ₄	U	A	S	R4	
J328-3	473	450	95	413	87	1.086	1.084	3.50	0 ³ ₁	U	U	R	S	
J333-2	460	442	96	419	91	1.077	1.072	3.50	0 ² ₁	U	I	R	S	S
J333-5	496	467	94	423	85		1.073	4.25	0 ² ₁	U	U	R	S	
J370-3	446	416	93	389	87	1.090	1.079	3.25	0 ³ ₁	A	A	Rv	R4	S
J573-1	378	353	94	313	83	1.094	1.084	4.00	1 ⁴ ₄	A	A	S	S	R2
J601-1	480	450	94	397	83	1.073	1.071	4.25	0 ⁴ ₄	U	U	R	S	R2
LSD .05	91	87		85										

a. 1=very rough to 5=very nice.

b. After cooking darkening. 0=white, 1=grey, 2=black areas; Superscript denotes number of tubers of that type.

c. Potatoes chipped after 2 and 6 weeks of reconditioning from 40°C storage.

A=acceptable, I=intermediate, U=unsatisfactory

d. R=golden nematode resistance from andigena, Rv=resistance from vernei, S=Susceptible

e. R3=Verticillium wilt resistance rated = 3; R5=resistance comparable to Katahdin, S=Susceptible.

f. R3=scab lesions of type 3, S=susceptible

Table 2.
H's-Riverhead - 1970
6 Replications of 15- foot plots

	Yield				Appearance score	Hollow heart	Specific gravity	A.C.D.	Chips 50°		GN	VW
	Total Cwt.	> 2 1/4 Cwt.	> 1 7/8 Cwt.	% 1 7/8					2wk.	6wk.		
Katahdin	361	291	344	95	3.83	1/18			U-I	I-A	S	R5
Katahdin	411	318	371	90	4.00	0		4 3 1 0 1 2 1 3 1 5	U	U	S	R4
H93 -2 *	407	291	370	91	3.17	0		0 1 2	U	I	R	S
H93 -3 *	497	403	471	95	3.50	0		0 1	U	A	R5	R5
H107 -11	273	242	266	97	4.00	0		0 6 2	U	I	R	S
H161 -1	380	288	345	91	3.33	6/18		0 1	U	I	R	S
H162-3 *	348	256	317	91	4.00	0		1 5 3 1 2 3	U	A	R	S
H162-4	258	145	219	85	3.00	0					R5	R5
H186 -10	324	220	290	89	3.17	1/18		7 1 0 1 4	I	A	R	S
H213 -7 *	371	291	345	93	4.00	2/18		1 1 2 2 1 0 1 2 2 1	I	A	R	S
H234 -7	323	162	284	88	2.83	1/18		0 1 2 3	U	U	R	S
H463 -1	206	150	189	91	3.50	1/18		0 1 2	I	A	R	S
H474 -4 *	397	316	369	93	3.33	1/18		0 8 1	U	A	S	R4
H479 -7	341	260	315	92	3.67	3/18		0	U	A	S	S
BR6321-1	405	332	382	94	2.50	1/18						
B5287-16	347	255	326	94	1.80	0						
LSD 05	104	91	96						A	A		

B5141-6 (Ienape)

* Saved for 1971 trials.

Table 3.

G's - Ithaca and Riverhead - 1970
6 Replications of 20-foot plots

		Yield				Appearance score	Hollow heart	Specific gravity	A.C.D. $\frac{5}{0} \frac{9}{1} \frac{2}{2} \frac{10}{0}$	Chips 40°		GN	VW
		Total Cwt.	>1 Cwt.	7/8 Cwt.	% 1/4	>2 Cwt.	1/4			2wk.	6wk.		
Katahdin	Ithaca (2x) Riv. (3x)	402 319	380 302	95 94	85 76	339 243		1.083		U	U-I		
G50-7	Ithaca Riv.	450 407	422 366	94 90	82 72	371 290		1.080	0 ⁸	U	U	Rv	S
G88-21 *	Ithaca Riv.	379 311	361 296	95 95	87 78	328 243		1.077		U		Rv	S
G92-6	Ithaca Riv.	528 437	507 382	96 87	90 75	477 327		1.091	0 ⁶ 1 ²		U	Rv	R ⁴
G93-18 *	Ithaca Riv.	531 520	501 485	94 93	87 84	465 439		1.082	0 ¹ 5 ² 2 ²	U	I	Rv	S
G94-12	Ithaca Riv.	473 574	418 546	88 95	80 84	378 484		1.078	0 ⁴ 2 ²	U	U	Rv	S
G164-1 *	Ithaca Riv.	502 388	470 345	94 89	85 73	428 283		1.082	1 ⁶ 2 ²	U	U	Rav	R3
G404-8	Ithaca Riv.	405 404	390 390	96 96	91 90	367 365		1.076	0 ⁷ 1 ¹	U	U	Ra	S
G481-14	Ithaca Riv.	332 393	308 361	93 92	83 77	275 303		1.084	0 ⁶ 2 ²	U	U	Ra	S
G694-14	Ithaca Riv.	480 507	458 462	95 91	86 75	413 381		1.080	0 ¹ 7 ¹	U	U	S	S
F289-11*	Ithaca Riv.	427 449	399 422	93 94	81 75	345 338		1.087	0 ³ 1 ¹	U	U-I	S	R ⁴
F293-10	Ithaca Riv.	362 238	336 217	93 91	87 72	316 172		1.071	1 ² 2 ²	U	U-I	S	S
LSD 05	Ithaca Riv.	54 65	55 60	55 60									

* Saved for 1971 trials.

Table 4.
1970 Ithaca
6 Replications of 20-foot plots

		Total Cwt.	>1 7/8 Cwt.	>2 1/4 Cwt.	%>1 7/8	%>2 1/4	Spec. Gravity	Appearance	Hollow heart	Int. Necr.
Katahdin	9"	425	406	361	95	85	1.080	3.58	0	3/36
	12"	434	403	351	93	81	1.075			
Katahdin	9"	428	408	363	95	85	1.079	3.75	1/36	1/36
	12"	394	370	318	94	81	1.079			
N.Y.-38	9"	446	424	398	95	89	1.081	3.75	0	2/36
	12"	401	379	349	95	87	1.083			
N.Y.-40	9"	456	434	397	95	87	1.081	2.75	1/36	0
	12"	447	424	396	95	89	1.082	several growth cracks		
N.Y.-43	9"	463	436	376	94	81	1.091	3.75	5/36	6/36
	12"	450	423	368	94	82	1.088	few growth cracks		
N.Y.-45	9"	390	359	309	92	79	1.077	3.17	2/36	12/36
	12"	430	405	365	94	85	1.074	few growth cracks		
N.Y.-46	9"	511	469	394	92	77	1.089	3.50	0	2/36
	12"	468	431	373	92	80	1.087			
N.Y.-47	9"	485	452	408	93	84	1.082	3.33		4/36
	12"	437	409	368	93	84	1.081			
N.Y.-48	9"	437	402	351	92	80	1.082	3.83		21/36
	12"	418	391	347	93	83	1.076			
F9-31	9"	492	465	419	95	85	1.083	1.83	2/36	16/36
	12"	457	431	386	94	84	1.086			
LSD ₀₅		45	44	46						

Table 5.
1970 Riverhead
6 Replications of 20-foot plots

		Yield in Cwt/A					Appearance	Hollow Heart	Int. Necr.
		Total	>1 7/8	>2 1/4	%>1 7/8	%>2 1/4			
Katahdin	9"	373	358	303	96	81	4.00	0	0
	12"	294	280	235	95	80			
Katahdin	9"	364	346	282	95	78	4.17	1/36	0
	12"	306	292	252	96	83			
Peconic	9"	372	339	217	91	58	3.00	0	0
	12"	347	315	223	91	64			
Wauseon	9"	352	336	283	96	81	3.50	4/36	0
	12"	307	292	239	95	78			
N.Y.-38	9"	322	303	249	94	77	3.58	0	0
	12"	315	286	243	91	77			
N.Y.-40	9"	347	334	294	96	85	2.83 few growth cracks	0	0
	12"	358	343	303	96	84			
N.Y.-41	9"	438	415	384	95	88	3.83	1/36	1/36
	12"	457	438	408	96	89			
N.Y.-43	9"	417	397	310	95	74	3.58	17/36	0
	12"	374	353	287	94	77			
N.Y.-45	9"	364	335	279	92	77	3.50	4/36	0
	12"	345	323	270	94	78			
N.Y.-46	9"	420	399	322	95	77	4.00	0	2/36
	12"	411	392	332	95	81			
N.Y.-47	9"	523	492	425	94	81	3.83 skins badly	0	4/36 at harvest
	12"	451	427	376	95	83			
N.Y.-48	9"	436	423	367	97	84	4.5 occasional	0	2/36 growth cracks
	12"	424	408	374	96	88			
F 9-31	9"	430	396	332	92	77	2.5	0	12/36
	12"	379	359	309	95	81			
LSD ₀₅		53	52	51					

Table 6.
1970 Cato (Muck)
4 Replications of 20-foot plots

		Yield in Cwt/A			% > 1 7/8	% > 2 1/4	Appearance	Hollow Heart	Int. Necr.
		Total	> 1 7/8	> 2 1/4					
Katahdin	9"	317	284	211	90	67	4.62	0	0
	12"	319	284	224	89	70			
Katahdin	9"	300	269	190	90	63	4.37	1/24	0
	12"	435	401	318	92	73			
Peconic	9"	279	223	113	80	41	3.75	1/24	0
	12"	269	228	126	85	47	all small		
N.Y.-38	9"	247	223	175	90	71	3.50	0	0
	12"	234	215	179	92	76			
N.Y.-40	9"	353	329	284	93	80	2.50	0	0
	12"	337	324	284	96	84	few growth cracks & knobs		
N.Y.-43	9"	460	418	325	91	71	3.62	8/24	0
	12"	411	366	296	89	72	few knobs		
N.Y.-45	9"	380	349	298	92	78	2.75	3/24	3/24
	12"	329	308	255	94	78			
N.Y.-46	9"	341	283	202	83	59	4.00	0	0
	12"	322	271	207	84	64	few knobs		
F9-31	9"	415	369	272	89	66	1.50	1/24	3/24
	12"	370	326	233	88	63	few growth cracks, sev. knobs		
LSD ₀₅	9"	108	107						
	12"	87	84						

Table 7.
Yields 2 1/4" Relative to Katahdin in the Same Trial.

		<u>NY-41</u>	<u>NY-45</u>	<u>NY-46</u>	<u>NY-47</u>	<u>NY-48</u>	<u>NY-49</u> (F289-11)	<u>NY-50</u> (G88-21)	<u>NY-51</u> (G93-18)	<u>NY-52</u> (G164-1)
<u>1966</u>										
Ithaca		126								
<u>1967</u>										
Ithaca		113	109	109	105	116	109			
Riverhead		217	176							
<u>1968</u>										
Ithaca		134	114	119	136	92	112	92	111	102
Riverhead		158	94	164	182	119	129			
Wainscott		183	156							
<u>1969</u>										
Ithaca	9"	113	114	111	108	117	118	113	132	92
	12"	122	114							
Riverhead	9"	148	114	135	138	105	124	96	177	96
Steuben	9"	181	164							
	12"	136	152							
Cato	9"	174	140							
	12"	137	118							
<u>1970</u>										
Ithaca	9"		86	109	113	97	102	97	137	126
	12"		104	106	105	99				
Riverhead	9"	127	92	106	140	121	139	100	181	116
	12"	174	115	141	160	159				
Cato	9"		141	96						
	12"		114	92						

Table 8.
Characteristics of the N.Y. Clones

NY-38	Specific gravity avg. 1966-69: 1.079 (Katahdin=1.074) ACD: better than Katahdin Chip: unsatisfactory Vert. wilt: less resistance than Katahdin Golden Nematode: andigena resistance
NY-40	Specific gravity avg. 1966-69: 1.072 (Katahdin 1.071) ACD: better than Katahdin Chip: unsatisfactory Vert. wilt: less resistance than Katahdin Golden Nematode: andigena resistance
NY-41	Specific gravity avg. 1966-69: 1.072 (Katahdin 1.071) ACD: same as Katahdin Chip: unsatisfactory Vert. wilt: same as Katahdin tho more susceptible to pinkeye. Golden Nematode: andigena resistance
NY-43	Specific gravity avg. 1966, 1968, 1969: 1.082 (Katahdin 1.074) ACD: much better than Katahdin Chip: unsatisfactory Vert. wilt: less resistance than Katahdin Golden Nematode: andigena resistance
NY-45	Specific gravity avg. 1966-69: 1.082 (Katahdin 1.074) ACD: poorer than Katahdin Chip: inconsistent Vert. wilt: more resistance than Katahdin Golden Nematode: andigena resistance
NY-46	Specific gravity avg. 1967-69: 1.086 (Katahdin 1.071) ACD: same as Katahdin Chips: unsatisfactory Vert. wilt: more resistance than Katahdin Golden Nematode: andigena resistance
NY-47	Specific gravity avg. 1967-69: 1.076 (Katahdin 1.071) ACD: much better than Katahdin Chips: unsatisfactory Vert. wilt: very high resistance Golden Nematode: andigena resistance
NY-48	Specific gravity avg. 1967-69: 1.068 (Katahdin 1.071) ACD: much better than Katahdin Chips: inconsistent Vert. Wilt: less resistance than Katahdin Golden Nematode: andigena resistance Scab: resistant

- F9-31 Specific gravity avg. 1967-69: 1.080 (Katahdin 1.071)
ACD: better than Katahdin ° °
Chips: very good from both 40° and 50° storage after 2 and 6 weeks
 reconditioning
Vert. wilt: less resistance than Katahdin
Golden Nematode: andigena resistance
Scab: resistant
- F289-11 Specific gravity avg. 1967-69: 1.081 (Katahdin 1.072)
(NY-49) ACD: better than Katahdin
 Chip: unsatisfactory
 Vert. wilt: more resistant than Katahdin
 Golden Nematode: susceptible
- G88-21 Specific gravity avg. 1968-69: 1.078 (Katahdin 1.078)
(NY-50) ACD: Better than Katahdin
 Chips: unsatisfactory
 Vert. wilt: susceptible
 Golden Nematode: vernei resistance
- G93-18 Specific gravity avg. 1968-69: 1.079 (Katahdin 1.078)
(NY-51) ACD: Better than Katahdin
 Chips: unsatisfactory
 Vert. wilt: susceptible
 Golden Nematode: vernei resistance
- G164-1 Specific gravity avg. 1968-69: 1.078 (Katahdin 1.078)
(NY-52) ACD: Better than Katahdin
 Chips: unsatisfactory
 Vert. wilt: more resistant than Katahdin
 Golden Nematode: andigena and vernei resistance

Table 9.
Specific gravity of the asexually propagated progeny of seedling tubers
classified by specific gravity.

	<u>1968</u>	<u>1969</u>	<u>1970</u>
1.045-1.049			1.075 (10)
1.050-1.054	1.062 (4)*		1.077 (17)
1.055-1.059	1.066 (10)	1.080 (4)	1.072 (20)
1.060-1.064	1.067 (10)	1.076 (10)	1.076 (19)
1.065-1.069	1.069 (10)	1.077 (7)	1.074 (21)
1.070-1.074	1.067 (10)	1.076 (9)	1.072 (20)
1.075-1.079	1.070 (10)	1.077 (7)	1.078 (17)
1.080-1.084	1.071 (10)	1.078 (11)	1.081 (16)
1.085-1.089	1.071 (10)	1.079 (10)	1.077 (17)
1.090-1.094	1.072 (10)	1.078 (8)	1.079 (16)
1.095-1.099	1.074 (10)	1.085 (9)	1.078 (18)
1.100-1.104	1.076 (10)	1.083 (10)	1.082 (18)
1.105-1.109	1.076 (8)	1.085 (10)	1.085 (17)
1.110-1.114		1.091 (5)	1.086 (17)
1.115-1.120			1.086 (11)
1.120-1.125			1.091 (6)
Katahdin			1.075 (25)

mean variance within classes
mean variance of Katahdin

57.4
12.5

* number of plots.

Table 10

Characteristics of parents selected
in three different years from 3 sets
of approximately 70 clones tested at two
locations of 15' plots in 4 replications.

<u>Year of progeny test</u>	<u>Year of parent's selection</u>	<u>Selection based upon</u>	Parent values in year of selection		
			<u>number > 2 1/4"</u>	<u>wt/tuber > 2 1/4"</u>	<u>yield > 2 1/4"</u>
1968	1964	Size (6)*	55.2	.703	40.2
		Number (6)	70.6	.607	41.6
		Yield (12)	65.0	.652	43.2
1969	1965	Size (6)	52.8	.615	32.5
		(12)	52.7	.589	31.1
		Number (6)	76.0	.478	36.3
		(12)	72.8	.490	35.6
1970	1966	Size (6)	69.2	.687	47.1
		Number (6)	89.1	.516	45.6
		Yield (12)	81.6	.591	47.4

* Number of clones

Table 11

Performance of progenies from parents selected for yield,
size of tuber, or number of tubers.

Type of cross	Spacing	Total yield in lbs/plot			Yield > 2 1/4" in lbs/plot			No. of tubers > 2 1/4"			Weight per tuber > 2 1/4" in lbs.		
		1968	1969	1970	1968	1969	1970	1968	1969	1970	1968	1969	1970
Yield x Yield	9"	51.7		68.7	37.8		46.4	84		107	.452		.434
	12"			64.5			46.5			103			.452
	Mean			66.6			46.5			105			.443
Number x Number	9"		53.9	72.6		31.5	49.5		82	118		.384	.423
	12"		54.4	65.8		32.3	44.9		79	105		.408	.427
	Mean		54.1	69.2		31.9	47.2		81	111		.396	.425
Size x Size	9"		53.1	70.0		33.0	49.8		82	100		.404	.510
	12"		53.3	61.0		36.9	43.8		86	94		.429	.469
	Mean		53.2	65.5		34.9	46.8		84	97		.416	.490
Number x Size	9"	54.2	53.0	70.4	40.4	31.8	48.9	89	79	105	.452	.403	.465
	12"		48.5	63.3		32.1	46.4		75	97		.433	.479
	Mean		50.8	66.9		31.9	47.7		77	101		.418	.472
Mean	9"		53.7	70.4		31.7	48.7		81	107		.391	.458
	12"		52.2	63.7		33.5	45.4		80	100		.418	.457
ANOVA													
Crosses		N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	**	N.S.	*	**
Spacings			N.S.	**		N.S.	*		N.S.	**		**	N.S.
Crosses x Spacings			N.S.	N.S.		N.S.	N.S.		N.S.	N.S.		N.S.	N.S.

* significant at 5% level.

** significant at 1% level.

N.S. not significant

NEW YORK
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Results of Potato Variety Trials in Upstate New York

Three variety trials were conducted in 1970. Two were located at the Vegetable Crops Research farm at Freeville, New York. The other was located in Erie County and was under the direction of Edward Rutkowski, Cooperative Extension Agent.

The field data of a trial in which 7 named varieties and 5 numbered selections were evaluated are contained in Table 1. Shurchip produced the highest yield of U.S. No. 1 (2-4") yields. However, seven other cultivars produced marketable yields above 300 cwt/a. Only B5698-8, Norchief, B5740-2, and Russet Burbank failed to do so in this trial.

Shurchip tubers are slightly irregular and flattened in shape with moderately deep apical eyes. The skin is slightly russeted and scurfy. This variety yields a high percentage of 2 to 3-1/4" tubers.

Katahdin yielded well in this trial and was lacking 12 cwt/a of being the top yielding entry.

B6097-7 produces attractive long, white-skinned tubers with shallow eyes. Due to its long shape, this selection and Russet Burbank have a higher percentage of 2" tubers than would be justified on a weight basis. No effort was made at this time of grading to separate sizes by weight. Some off-shaped tubers were observed in B6097-7.

Sioux, Raritan, N.Y.-41 were the only varieties which produced more than 30% of their total yield in the size category above 3-1/4". Sioux produces tubers which are round with moderately deep apical eyes and a heavily checked red skin.

Raritan had the highest specific gravity in the trial. Tubers of this variety are oblong with a slightly netted skin. The greatest amount of oversize occurred in N.Y.-41. Only one of 24 oversized tubers of this entry had hollow heart.

The tubers of B6138-3 have moderately deep apical eyes and deep purple skins. The specific gravity of this selection is high. Its potential is restricted to the processing market.

Early Varieties

Norchief outyielded Norland by 97 cwt/a in the Erie County trial (Table 3). This variety matures slightly later than Norland but produces tubers with a deeper red color. Its poor performance in the main variety trial (Table 1) may reflect its 2nd early maturity compared to the other later maturing varieties.

Sable's performance in the Erie County and Freeville early variety trials was affected by poor stands at both locations. The appearance of Alamo was marred by prominent lenticels and rhizoctonia in Erie County.

Seminole tubers bruised more easily than the other varieties in the Freeville trial. They also had the highest specific gravity in that trial.

Storage Trial Results

Table 4 contains the results of the chip color trials conducted on the Variety, Spacing, and Fertilizer trial conducted in 1969. Only variety and fertilizer rate effects were evaluated. Three storage treatments were also evaluated. Storage at a constant 50° resulted in acceptable color for all treatments. Norchip, Peconic, and B5141-6 produced chips that had Agtron meter readings above 60 when stored at the 45°-60° regime. Peconic and B5141-6 chips also had readings in the 60's when stored at 45°. In all cases, the low rate of fertilization (1500 #/A of 10-20-20) resulted in darker chips than the higher rate (2500 #/A of 10-20-20). This may be due to the extremely high rate of K₂O applied per acre.

The storage trial results for the 1969 Freeville variety trial are contained in Table 5. B5415-6 and N.Y.-39 were the only cultivars which did not produce acceptable chips.

N.Y.-30 and B5415-6 were relatively free of after-cooking darkening, N.Y.-39, which was used as a guard row, appears to be susceptible.

B6316-7 produced considerably more sprouts than the other varieties tested. N.Y.-38 produced the least.

All named varieties were relatively free from after-cooking darkening in the Erie County trial (Table 6). The flesh of B6097-9 was discolored prior to cooking, and a true evaluation of after-cooking darkening was not possible. This discoloration may be attributable to harvesting this entry too early and the subsequent storage of very immature tubers. This selection also sprouted the most in storage.

All varieties in the Wyoming County trial produced light colored chips when stored at 50°.

Upstate New York Table 1. Variety Trial, Freeville, N.Y. 1970 ^{1/}

Variety	Total Yield cwt/A	U.S. No. 1 cwt/A		Mean Tuber Wt. (oz.)	Specific Gravity	Vine Maturity ^{2/}
		2 to 3-1/4	2 to 3-1/4			
Shurchip	418	301	65	5.2	1.063	7
Katahdin	404	265	89	5.6	1.071	5
B6097-7	484	336	17	5.4	1.082	5
Sioux	433	209	138	6.2	1.073	8
Raritan	392	218	123	7.4	1.087	6
N.Y.-41	475	168	168	8.5	1.073	6
B6138-3	409	277	52	4.9	1.084	6
Kennebec	450	238	64	6.5	1.074	6
B5698-8	337	244	35	4.6	1.068	8
Norchief	361	251	27	4.0	1.074	9
B5740-2	340	236	14	4.0	1.062	9
Russet Burbank	363	201	6	5.3	1.081	4
D (05) Tukey	103	104	64	.89	.006	

Variety	% of Total Yield				Misshapen	Sunburn
	<2	2 to 3-1/4	3-1/4 to 4	>4		
Shurchip	9.5	72.1	15.3	.9	.9	1.1
Katahdin	8.6	65.5	22.0	.9	.9	2.2
B6097-7	17.8	69.5	3.6	-	5.5	3.6
Sioux	4.8	48.2	31.9	1.2	3.1	.3
Raritan	7.5	55.7	31.3	-	2.8	2.1
N.Y.-41	1.7	35.4	35.4	8.5	3.6	3.4
B6138-3	10.8	67.8	12.6	.4	6.3	-
Kennebec	8.2	52.9	14.2	1.1	5.7	2.9
B5698-8	15.1	72.5	10.5	.7	1.1	.2
Norchief	20.9	69.5	7.5	-	1.6	.4
B5740-2	21.2	69.5	4.1	-	3.0	2.2
Russet Burbank	26.9	55.3	1.6	.4	5.3	.2

^{1/}Planted May 12, within row seed spacing 9", between row spacing 34", 1500 #/A of 10-20-20 applied at planting; Killed September 8, 1970, harvested October 2, 1970; 4 replications.

^{2/}Vines rated for maturity September 1, 1970, 1-9; 9 = completely dead, 1 = completely green.

Upstate New York Table 2. Early Variety Trial, Freeville, N.Y. 1970^{1/}

Variety	Mean Tuber Wt. (oz.)	Total Yield cwt/A	U.S. No. 1		% of Total Yield					Specific Gravity	
			cwt/A		U.S. No. 1						
			2 to	3-1/4	2 to	3-1/4	3-1/4	to	> 4		
			3-1/4	to 4	3-1/4	to 4	to 4	to 4	to 4		
Chippewa	4.94	404	270	28	19.2	66.8	6.9	2.1	4.6	.03	1.071
Superior	5.64	332	240	41	9.8	72.2	12.3	.04	4.8	.04	1.074
Sable	7.06	333	215	52	7.1	64.6	15.6	1.3	7.3	4.2	1.060
Seminole	6.64	299	200	63	6.5	66.8	20.9	.05	3.3	2.1	1.081
D (05) Tukey	0.78	41	46	39							.010

^{1/} Planted May 19, within row seed spacing 9", between row spacing 34", 1500 #/A of 10-20-20 applied at planting;
Harvested August 27, 1970; 4 replications.

Upstate New York Table 3. Early Variety Trial, Erie County, 1970^{1/}

Variety	Mean Tuber Wt. (oz.)	Total Yield cwt/A	U.S. No. 1		% of Total Yield			
			cwt/A	%	Misshapen	Sunburn	Rhizoc.	S.G.
Alamo	4.56	357	270	75.8	1.2	6.3	7.6	1.063
Sable	5.81	285	252	88.3	1.7	4.9	1.5	1.060
Norchief	4.47	436	373	88.5	1.9	3.1	1.5	1.060
Norland	3.63	324	276	85.4	.8	1.3	1.1	1.067
D (05) Tukey	.74	39	46					.003

^{1/} Planted April 17, within row seed spacing 9", between row seed spacing 34",
1400 #/A of 10-15-15 (2% Mg) applied at planting; Killed July 27; Harvested
August 12; 4 replications.

Upstate New York Table 4. Variety, Spacing & Fertilizer Trial 1969.
Chip Color

Treatment ^{1/}		Agtron Meter Readings ^{2/}		
		50°	45°-60°	45°
Norchip	High	67.0	64.0	55.7
	Low	64.5	55.3	45.7
Peconic	High	69.2	65.0	61.5
	Low	66.8	63.3	57.7
Jewel	High	60.7	56.5	55.7
	Low	62.8	48.5	52.5
Katahdin	High	66.7	57.0	46.7
	Low	59.0	46.0	32.0
B5141-6	High	66.0	64.2	67.0
	Low	65.3	62.0	61.2

^{1/} Varieties ranked in descending order of U.S. No. 1 (2-4") yields (see 1969 report).

^{2/} Color of crushed chips on Agtron F reflectance colorimeter set so that discs 5005 and 5052.2 gave readings of 0 and 100 respectively. Higher values indicate lighter chip color. Minimum values for "generally acceptable color" would probably range from 55 to 65. Samples were divided into 3 groups. The first group was stored at 50°F from time of harvest until time of chipping on January 13. The other two groups were stored under the same conditions until October 3 when they were placed in 45°F storage. The second group was conditioned for 5 weeks at 60°F prior to frying on January 13. The third group was held at 45°F until frying on January 28.

Upstate New York Table 5. Variety Trial, Freeville, N.Y. 1969
Storage and Cooking Results.

Variety ^{1/}	Chip Color ^{2/} Agtron Meter Readings	After-Cooking Darkening Rating ^{3/} 2/3/70	Sprout Weight as % Total Weight 3/17/70
N.Y.- 30		4.9	2.2
B5415-6	46.3	4.9	4.6
N.Y.-36	60.4	4.5	4.3
Wauseon	59.3	4.9	5.2
B5698-8	60.6	4.6	2.0
Katahdin	60.1	4.6	4.8
BR6316-7	65.9	4.8	8.1
Kennebec	61.1	4.4	3.7
B4523-8			2.2
N.Y.- 38	59.1	4.8	1.2
Russet Burbank	64.4	4.8	1.3
B4557-2			3.6
(Guard) ^{4/}			
N.Y.-39	37.5	4.0	2.8
D (05) Tukey	14.8	n.s.	2.1

^{1/} See footnote 1, Table 4. N.Y. 30, B4523-8, and B4557-2 were not included in the chipping and/or after-cooking darkening tests.

^{2/} The procedure is the same as outlined in footnote 2, Table 4, but storage temperatures were maintained at 50°F until frying on January 19.

^{3/} Five tubers from each 4 field replications were peeled, dipped in 0.5% sodium bisulfite; cooked for 7 minutes in an autoclave at 15 p.s.i., and rated from 1-5, where 1 = severe after-cooking darkening; 5 = no darkening.

^{4/} Guard rows, not included in A.O.V.

Upstate New York Table 6. Erie County Variety Trial 1969

Variety ^{1/}	After-Cooking Darkening Rating ^{2/} 2/5/70	Sprout Weight as % Total Weight 2/4/70
Sable	5.0	2.44
Chippewa	5.0	4.11
Alamo	4.95	.79
Superior	4.95	1.80
B6097-9	4.03/	6.44
D (05) Tukey	.53	1.86

1/ See footnote 1, Table 4

2/ See footnote 3, Table 5

3/ Some tubers were discolored prior to cooking, probably due to storage of immature tubers.

Upstate New York Table 7. Wyoming County Variety Trial 1969. Chip Color

Variety	Agtron Meter Reading ^{2/} 1/12/70
Peconic	74.4
Norchip	69.0
Katahdin	67.4
Russet Rural	66.6
Jewel	71.5
B5141-6	74.1
	n.s.

1/ See footnote 1, Table 4.

2/ See footnote 2, Table 5.

NORTH CAROLINA
F. L. Haynes

Breeding Program

The primary objectives are the development of early-maturing varieties with superior chipping quality, adaptation to the Coastal Plain, and the incorporation of resistance to major diseases, principally common scab.

Hybridization. Crossing was again done during July in a room fitted with inexpensive lighting and temperature controls. The room was equipped with portable benches, air-conditioning sufficient to maintain room temperature at 65°F, and lighting fixtures to deliver 1500 foot-candles at the bench surface. Using the cut-stem technique with inflorescences harvested from field plots, crosses were successfully made in quantity in a minimum of time. Fruits were mature in 45 days.

Seedling Production and Maintenance. Approximately 12,000 single-hill segregates were grown in the field from which 870 clones were selected for further evaluation. 460 advanced clones were grown at one or more locations either in the mountains or both there and the coastal area. All breeding clones are grown for seed maintenance and increase at a location in the mountains.

Advanced Trials. Selected clones were tested at four locations in the early commercial area with advanced trials at three. The design was a randomized complete block with augmented entries. In addition to the North Carolina clones, the trials included USDA clones and new varieties and breeding lines from Minnesota, Nebraska, New York, North Dakota, and Pennsylvania. The USDA (B) clones included were all selections made in North Carolina from segregating families provided by the National Program. The results of these trials are presented in N. C. Tables 1-3. Yields presented are totals because circumstances prevented the grading of tubers. The growing season at Aurora was about average. Rainfall distribution was abnormal. The early season was very wet and late April and May were very dry. This plot received three irrigations of one inch each during May. The seasons at both Camden and Tyrell were poor. Heavy rains in March and early April were experienced at both locations. Camden was planted before these rains resulting in poor stands. The Tyrell planting was delayed by one month because of them.

Adaptation Study

A project is being conducted to study the adaptation to the temperate zone of diploid Andean species as potential sources of new germ plasm for commercial exploitation. Two diploid species, S. phureja and S. stenotomum, were grown at Fletcher in two populations, each being made up of about equal numbers of both species. The populations were: (1) 6000 segregating seedlings of 42 families. 1633 tuber clones were selected from 36 families. This will comprise the 1971 tuber planting. (2) a tuber planting of 1400 selected clones of 22 tuber families. Seeds were harvested from each of the 22 and from 14 additional unselected families, a total of 36 families which will comprise the 1971 segregating population. In addition, 16 clones selected for high productivity under long days and 5 clones selected because of survival of heavy frost were grown in rows. The 16 clones continued to produce large tubers under long days. These will be selectively hybridized in 1971 and their segregating populations studied for productivity. The frost resistance will be tested in 1971 both in spring and fall. Tuber size and number continued to improve in selected families, and percentage of segregates tuberizing continued to increase.

North Carolina Table 1. Potato performance trial at Aurora. Plots 2 rows by 20 ft, 4 replications. 29 varieties by 4 replications plus 28 augmented entries. Planted 3/9/70, harvested 6/30/70 (112 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 2300 lbs/A 8-8-8.

Variety	Total yield cwt/A	Specific gravity	Chip ¹ color	Appear- ² ance	Maturity
Pungo	346	1.068	5.0	7.0	Midseason
Norchip	321	74	2.2	7.0	Med. early
B7012-N20	314	--	---	7.5	Midseason
62C6-5	313	--	---	7.0	Midseason
58C19-2	305	65	3.8	7.0	Early
B6987-N29	302	69	4.4	7.5	Med. early
B6546-N4	301	59	2.6	8.5	Med. early
Pa.6HS-9	301	64	4.0	6.8	Midseason
B6987-N49	289	--	---	7.0	Midseason
62C8-6	288	60	3.8	7.0	Med. early
La Chipper	282	66	2.4	7.0	Med. early
B7031-N2	279	67	3.2	8.5	Med. early
B7008-N4	272	61	5.6	7.7	Med. early
B7033-N4	271	70	2.8	7.5	Med. early
64C5-12	269	63	4.6	7.5	Med. early
B7012-N8	269	--	---	7.7	Med. early
B6990-N5	267	78	3.2	8.2	Med. early
Superior	265	70	3.0	7.7	Early
B6597-N3	265	74	3.0	7.7	Med. early
BR6312-N5	260	63	5.0	8.7	Med. early
B6987-N47	248	68	2.6	8.5	Early
62C3-6	230	68	3.4	7.7	Early
B7012-N17	223	69	4.8	7.2	Midseason
64C5-2	212	62	3.8	7.5	Med. early
B7012-N19	211	--	---	7.0	Midseason
B7003-N4	206	--	---	7.7	Early
B6987-N44	205	--	---	7.2	Med. late
68C5-10	189	--	---	7.7	Med. early
B6987-N32	161	--	---	7.0	Med. late

Augmented entries - Rep. 1 - adjusted yields

Pa.7GW-9	334	1.083	2.8	7.9	Midseason
B6959-N2	331	--	---	6.0	Midseason
B6952-N15	324	--	---	7.9	Med. late
B6929-N4	305	69	3.4	8.9	Early
B6955-N10	285	--	---	6.9	Midseason
Pa.7IU-2	262	70	4.0	7.9	Midseason
NY 41	256	--	---	7.9	Late

North Carolina Table 1 continued.

Augmented entries - Rep. 2 - adjusted yields

B7031-N3	340	1.059	3.8	8.0	Midseason
B6943-N2	311	79	2.8	7.0	Early
B6937-N3	245	--	---	7.0	Midseason
B6937-N4	236	--	---	8.0	Early
Pa.6UK-21	173	65	5.2	7.0	Midseason
B6546-N1	170	--	---	7.0	Med. late
B6943-N11	120	--	---	9.0	Early

Augmented entries - Rep. 3 - adjusted yields

NY 38	359	--	---	8.0	Med. late
B7041-N3	339	1.057	3.0	9.0	Midseason
B6959-N1	316	--	---	8.0	Midseason
B6936-N10	303	--	---	7.0	Midseason
Pa.7GT-2	290	76	3.4	6.0	Med. late
B7034-N21	271	62	3.4	8.0	Midseason
B6987-N48	208	--	---	7.0	Med. early

Augmented entries - Rep. 4 - adjusted yields

NY 45	297	--	---	9.0	Med. late
B6930-N4	294	1.071	2.0	8.0	Med. early
B6936-N7	268	--	---	7.0	Midseason
B7031-N1	258	70	3.0	7.0	Early
B6955-N3	212	--	---	7.0	Midseason
B6937-N5	179	--	---	8.0	Early
B6930-N3	140	--	---	8.0	Early

LSD (.05) Replicated entries (RE) and augmented (AE)

RE	49	0.6
AE same rep.	98	1.3
AE dif. rep.	100	1.3
RE vs AE	79	1.0
CV (PCT)	13.2	5.9

¹ Chip color determined by Wise Foods, Berwick, Pa. Average of 5 samples, 1 per week for 5 weeks following harvest. 1-4 acceptable with grade 1 = perfect; 5 usable but not desirable. 6-14 unacceptable with 14 = black.

² Appearance

1 = Very poor	7 = Good
3 = Poor	9 = Excellent
5 = Fair	

North Carolina Table 2. Potato performance trial at Camden. Plots 2 rows by 20 ft, 4 replications. 29 varieties by 4 replications plus 28 augmented entries. Planted 3/11/70, harvested 6/29/70 (109 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 2700 lbs/A 5-10-10.

Variety	Total yield cwt/A	Specific gravity	Chip ¹ color	Appear- ² ance	Maturity
62C6-5	278	1.071	4.0	7.0	Midseason
Superior	277	73	2.2	8.3	Early
Shurchip	259	66	3.2	7.7	Med. early
La Chipper	257	67	2.6	7.2	Med. early
B6597-N3	257	73	2.6	8.0	Med. early
M4086	252	65	2.8	8.5	Med. early
B6546-N4	251	63	2.2	8.7	Med. early
Pungo	250	68	4.0	7.0	Midseason
Norchip	247	74	2.2	7.2	Med. early
NB92.56-4	243	71	2.2	8.2	Med. early
ND5922-12	236	65	3.2	8.2	Midseason
65B4-5	232	--	---	7.0	Med. late
62C8-6	230	62	3.8	7.5	Med. early
58C19-2	228	67	5.2	7.5	Med. early
64C5-12	225	65	3.8	8.2	Midseason
M174	221	69	1.8	8.0	Med. early
ND6993-13	215	68	2.6	6.0	Med. early
NB91.57	209	67	4.8	7.5	Med. early
BR6312-N5	207	62	2.8	9.0	Med. early
66B4-2	199	64	2.6	7.7	Med. early
B6930-N1	196	62	4.4	9.0	Early
62C3-6	191	66	2.2	8.0	Early
M1317	180	65	3.4	8.0	Early
65B4-2	165	--	---	6.2	Midseason
Pa.6HS-9	161	60	3.6	7.0	Midseason
64C5-2	145	--	---	6.2	Midseason
NB99.56	145	--	---	8.0	Extra early
B6937-N9	138	--	---	6.7	Late
B6937-N7	128	--	---	7.5	Med. early

Augmented entries - Rep. 1 - adjusted yields

68C5-13	268	--	---	6.0	Med. late
68C1-3	219	1.065	3.2	8.0	Early
68C6-1	216	63	1.0	9.0	Early
68C1-2	193	80	1.2	9.0	Early
B6987-N25	190	84	1.4	8.0	Med. early
68C5-10	173	64	5.8	8.0	Med. early
B6959-N3	151	--	---	6.0	Med. late

North Carolina Table 2 continued.

Augmented entries - Rep. 2 - adjusted yields

NY 41	234	10.64	4.8	7.1	Med. late
B7034-N16	231	--	---	8.1	Midseason
65C13-8	228	71	3.0	8.0	Midseason
NY 45	175	68	5.4	8.0	Med. late
B6973-N1	156	54	5.4	7.0	Midseason
68C5-17	153	66	4.8	8.0	Early
65C13-1	97	55	5.6	8.0	Midseason

Augmented entries - Rep. 3 - adjusted yields

68C5-18	319	--	---	8.1	Midseason
68C5-22	289	1.064	3.2	9.0	Early
B6973-N4	289	59	5.0	9.0	Med. early
68C5-9	283	70	4.2	7.0	Med. early
58C19-2W	227	67	4.2	8.0	Med. early
B7033-N1	162	67	3.2	7.0	Midseason
B6985-N3	118	--	---	7.0	Early

Augmented entries - Rep. 4 - adjusted yields

B7034-N6	306	1.073	1.4	7.8	Med. late
68C5-1	244	66	3.4	8.8	Extra early
68C5-8	221	71	3.4	8.8	Early
B7034-N9	198	68	2.6	7.8	Med. early
NY 38	156	60	6.4	6.8	Late
B6987-N28	156	73	4.4	6.8	Med. early
B6985-N4	110	73	2.4	7.8	Early

LSD (.05) Replicated entries (RE) and augmented (AE)

RE	44	.6
AE same rep.	87	1.2
AE dif. rep.	89	1.3
RE vs AE	70	1.0
CV (PCT)	14.4	5.8

¹ and ² See footnote, N. C. Table 1.

North Carolina Table 3. Potato performance trial at Tyrell. Plots 2 rows by 20 ft, 4 replications. 27 varieties by 4 replications plus 20 augmented entries. Planted 4/9/70, harvested 7/1/70 (82 days). Spacing: 10-inch hills, 40-inch rows. Fertilized 2500 lbs/A 5-10-10.

Variety	Total yield cwt/A	Specific gravity	Chip ¹ color	Appear- ² ance	Maturity ³
B6973-N4	306	1.049	5.4	9.0	
B6946-N3	298	61	5.6	8.5	
Norchip	284	72	1.6	8.0	
La Chipper	279	67	2.8	7.0	
68C5-9	273	--	---	6.0	
Pa.6HS-9	265	61	2.6	7.5	
ND6993-13	264	68	2.8	7.7	
B6546-N4	259	61	1.4	8.2	
Pungo	247	--	3.6	6.7	
B6597-N3	247	71	2.8	8.0	
62C2-41	239	--	---	6.5	
58C19-2	235	62	2.4	8.0	
62C8-6	231	60	5.0	7.5	
B6943-N1	229	70	5.6	7.7	
62C6-9	225	--	---	7.0	
62C3-6	223	61	3.0	6.5	
B6987-N24	222	69	1.2	8.2	
ND5922-12	211	65	3.2	9.0	
B6937-N12	210	--	---	6.7	
68C5-1	207	65	4.8	9.0	
64C5-12	207	64	5.2	8.0	
B6985-N8	203	82	3.8	7.2	
B6952-N6	189	--	---	6.7	
64C5-2	186	60	4.0	7.7	
B6937-N11	181	--	---	6.2	
65C13-8	177	63	4.0	7.7	
B6952-N2	136	--	---	6.0	

Augmented entries - Rep. 1 - adjusted yields

B6990-N3	288	1.059	4.1	9.0
B6987-N36	261	70	1.4	9.0
B6990-N1	252	64	4.2	8.0
B7012-N25	248	64	6.2	9.0
B7005-N6	222	--	---	8.0

Augmented entries - Rep. 2 - adjusted yields

B7012-N12	269	1.057	4.2	8.0
B7012-N11	239	--	---	6.0
B7012-N22	223	65	4.6	8.0
B7034-N23	223	59	6.4	9.0
B7012-N7	176	--	---	7.0

North Carolina Table 3 continued.

Augmented entries - Rep. 3 - adjusted yields

B7005-N1	320	1.061	4.0	9.0
M4086	264	61	2.4	9.0
M1317	258	59	3.6	9.0
66B4-2	232	61	4.2	9.0
B7012-N24	199	--	---	7.0

Augmented entries - Rep. 4 - adjusted yields

B7012-N18	320	1.058	5.4	9.0
B6987-N30	316	68	2.0	8.0
M174	307	68	1.6	9.0
B6987-N43	228	77	1.8	8.0
B7012-N13	186	65	4.0	7.0

LSD (.05) Replicated entries (RE) and augmented (AE)

RE	50	.6
AE same rep.	99	1.2
AE dif. rep.	101	1.3
RE vs AE	80	1.0
CV (PCT)	15.2	5.8

¹ and ² See footnotes, N. C. Table 1.

³ Maturity data not recorded because of immature state of all entries at 82 days after planting.

North Dakota
Robert H. Johansen and Joseph E. Huguelet
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Potato Crossing Program

Two hundred and twenty-seven potato crosses were made during March and April 1970. Crosses again involved parents with good red skin color, russetting, high specific gravity, high yield, good processing qualities and disease and insect resistance.

Greenhouse and Field Seedlings

Seedling tubers were again produced in the greenhouse during the summer and early fall. Approximately 30,000 seedlings were harvested from seed produced from crosses made during the spring of 1970. The planting of the true seed began on June 24th, and transplanting of seedlings to 3 inch pots in the greenhouse was completed on July 27th. Greenhouse seedlings were harvested during October and November.

At the Langdon Experiment Station, 27,237 seedling tubers representing 200 families were planted in the field on May 26 and 27th. Approximately 1,500 seedlings were saved in the field at harvest time on September 21 and 22nd for further study and testing. After specific gravity and close observation, 648 clones were saved for planting in the field next spring.

Advanced Selections

Seven hundred and eighteen advanced selections were planted at Casselton, Grand Forks, and Fargo. The Casselton plot was planted on May 19, and 20th and the Grand Forks plot was planted on May 22.

For the second year in a row the plot at Casselton was partly destroyed by flooding. On May 28, a 3.50-inch rain was recorded and with several other showers occurring the following week, approximately one-half of the plot had 100 percent seedpiece decay and did not emerge. The plot next season will be moved to the Agronomy Seed Farm where the land is higher and the drainage better.

Again, because of the loss at Casselton, the seed increase of advanced selections was done at Grand Forks. The Grand Forks plot consists of the same selections. However, the seed from this plot is not as disease free as the indexed material grown at Casselton.

Processing Trials

Potato processing trials were conducted in cooperation with Frito-Lay, Inc., Campbell Soup Co., Wise Potato Co., and the USDA Processing Lab at East Grand Forks, Minnesota. A grant has been received from the Pillsbury Company, Grand Forks, North Dakota, and preliminary testing of new advanced selections was started in October 1970.

Varieties and selections tested for processing qualities were planted in 10 or 20-hill plots on May 22 and harvested on the 16, 17, and 29th of September. In addition to the block planting, 16 advanced selections and 4 check varieties were planted in large increase plots at Grand Forks. Material harvested from this plot was sent to Campbell Soup Company, Wise Potato Chip Company, and the Processing Lab at East Grand Forks, Minnesota. This material will receive a more intensive processing test than the 10- to 20-hill plots.

Forty-eight Frito-Lay selections were planted at Grand Forks. Adaptation and chip quality studies were made on these selections. From the 1969 plot, 13 Frito-Lay selections tested in February 1970 had an Agtron reading of 35 and above.

For the different processing tests such as French frying, soups, etc., 7 advanced North Dakota selections and 18 Campbell Soup selections were sent to the Campbell Soup Company in November 1970. A total of 64 Campbell Soup selections identified with B. R. prefix were planted at Grand Forks. Scab and adaptation notes were also taken on these selections during the growing season.

Last season several advanced North Dakota selections tested by Campbell Soup Company scored quite outstanding in the French fry and boiling evaluations. ND7103-4, ND7135-9, and ND5761-5 were some of the selections that appeared to have promise.

Tests by the Wise Potato Chip Company, Berwick, Pennsylvania, showed that ND5979-2, ND6993-13 Russ, ND7135-9 and ND7196-18 all produced acceptable colored chips before storage. ND5979-2 was the only selection to produce acceptable colored chips after 3 months storage at 45°F. Storage at 70°F for two months for reconditioning purpose showed that ND5972-2, ND6993-13 Russ, ND7097-2 and ND7196-18 and the check varieties Kennebec and Norchip all produced good acceptable chip color. Glycoalkoloid tests were also made on several selections by the Wise Potato Chip Company.

Twelve varieties and selections (ND table 1 and table 2) grown at Grand Forks and Park River were tested for chip quality. The samples were removed from 40°F storage and stored at 70°F until the final chip tests were made 4 weeks later. Each sample was chipped on December 22, January 6, January 13, and January 20.

Of the named varieties grown at Park River and Grand Forks, Norchip and Monona produced the lightest colored chips. Cobbler and Kennebec also produced light-colored chips while Anoka produced the darkest colored chips among the named varieties.

Of the numbered selections ND7103-4, ND6993-13 Russ and ND7196-18 all produced chips equal in color to Monona but slightly lighter in color than Norchip. These North Dakota selections were also lighter in chip color than Kennebec and Cobbler when chipped out of cold storage at 40°F.

In the chip tests only the numbered selections ND6925-13 Russ, ND7003-2 Russ and Anoka produced unacceptable chip color and quality.

Culinary Tests

Twenty-six varieties and selections grown in the 1969 potato variety trials at Grand Forks and Park River were tested for boiling and baking qualities. Although this test has certain limitations; like, what constitutes good texture and flavor; it does offer some measure as to the cooking quality of a particular variety. Sloughing and color are naturally easy to determine. The high specific gravity varieties sloughed severely when boiled while the low specific gravity varieties were very watery and waxy. The results of the cooking tests are found in ND table 3 and 4.

Promising Selections

ND6925-13 Russ, ND6993-13 Russ, ND7003-2 Russ, ND7196-18 and one or two other selections are presently being increased in acre lots by several North Dakota growers. ND6925-13 Russ produces good yield and has good russetting while ND6993-13 Russ also has good russetting and type but is quite susceptible to growth cracking. However, ND6993-13 Russ has good chipping and French fry qualities. ND7196-18 continues to look good as a chipping variety. This variety sets heavy and has some resistance to late blight. No decision has been made as to whether any of these varieties will warrant future naming.

Several new selections were again distributed to several growers at Beach, North Dakota, and some of these selections look promising. In addition to the new selections, two growers at Beach are presently increasing two promising Russets ND7642-2 Russ, ND7642-3 Russ and a red selection ND6334-2R. The ND7642-3 Russ and the red selection ND6634-3R looked very outstanding in the 1970 trials.

Variety Trials

Replicated variety trials were again grown at Grand Forks, Park River, Minot, Williston and Carrington (dry land and irrigation). A small trial grown under irrigation at Oakes, North Dakota, was also planted in 1970. The trials at Minot and Williston were under the supervision of B. Hoag and E. French. Mr. Howard Olson conducted the trials at Carrington; while at Park River, Mr. Wayne Grinde was in charge. At Grand Forks, Mr. Don Uhler was in charge of general care and maintenance of the trial.

The varieties were grown in plots of 25 hills and replicated four times in a randomized block. Twenty-four (24) varieties and selections were grown at Park River, Grand Forks, and Carrington. Minot and Williston had 16 varieties and selections in trial. Marketable yields consisted of all US No. 1 tubers over 1-7/8 inches in diameter. Specific gravity was determined by the use of a potato hydrometer.

Spacing, fertilizer, soil type, planting and harvest dates of each location were as follows:

Location	Row	Plant	Fertilizer	Soil Type	Planting Date	Harvest Date
Grand Forks	38"	12"	300#/A 20-20-10	Bearden Clay Loam	5/22	9/29
Park River	36"	12"	300/A 20-20-10	Glyndon Silt Loam	5/21	9/14
Minot	42"	14"	22+34+0 Broadcast	Williams Loam	5/22	9/23
Williston	38"	15"	100#/A 16-48-0	Loam	5/27	10/1
Carrington (Irr.)	36"	7.2	300#/A 20-20-10	Kief Loam	5/19	9/17
Carrington (Dry)	36"	10.0	300#/A 20-20-10	Kief Loam	5/19	9/16

The 1970 season had good moisture at all locations at planting time. In some cases planting was delayed because of wet ground. In western North Dakota, Minot had wet, rainy weather at planting time and during July and September, otherwise, it was quite dry. For example, Minot had 1.54 inches of rain in June, 7.05 inches in July and .68 inches in August and 1.76 inches in September. In most cases, fairly good growing conditions prevailed up until the middle of July then the weather turned dry and warm. Grand Forks had fairly ideal conditions as the rains came at the right time and quite regular.

The fairly good yields at most all locations reflected the good growing conditions for potatoes in 1970. However, this was not true for the entire state as Fargo and the southeastern part of the state had extremely dry and hot weather. Fortunately potato variety trials were not planted in this area of North Dakota during 1970. A small trial with F. L. Behling Company, Moorhead, Minnesota, was planted near Glyndon, Minnesota. Only chipping varieties were planted in this trial.

Viking was again the top yielding variety. Good yields were also expressed by Chieftain and Norland (ND table 5). The growing season apparently was ideal for Norlands and Chieftains. The good yields and type of Chieftain is reflected by its production in North Dakota as this variety has been steadily increasing in popularity. Red Pontiac was eleventh (11) in average yield of all varieties grown in the North Dakota trials. This was surprising as Red Pontiac is generally up near the top in yield. Monona again did not produce high yields. ND7196-18 averaged 193 cwt per acre compared to Monona with 148 cwt per acre. ND6925-13 Russ produced US No. 1 yield higher than ND6993-13 Russ but no doubt the amount of growth cracking and deformed tubers in ND6993-13 Russ greatly reduced the US No. 1 yield of this variety.

Of the varieties grown only in the trials at Park River, Grand Forks, and Carrington, ND6634-2R, Shurchip, and ND7103-4 all produced good yields. ND7103-4 is a cross between Norchip and La Chipper and looks very promising. The chipping quality and type of ND7103-4 is good. ND6634-2R has outstanding type and color and has created a lot of interest when shown at the field day at Grand Forks on September 10. ND7642-3 Russ also looked good in the 1970 trials. The russetting and type of this russet selection was superior to most other russets in trial.

The irrigated trial at Carrington outyielded the dry-land trial by an average of 148 cwt per acre. The trial at Grand Forks had an average overall yield almost identical to the yield of the Carrington Irrigation trial. When comparing yields at all locations, Williston produced the lowest overall average yield.

The highest specific gravity was found in trials at Williston and Minot (ND table 6). Little difference in specific gravity was found at Park River, Grand Forks, and Carrington dry land. Carrington irrigation produced potatoes that were again lower in specific gravity than the dry-land trial.

ND6993-13 Russ produced the highest specific gravity followed closely by Norchip, Cobbler, ND7196-18, ND6925-13 Russ, Norchief and Norgold Russet. Red Pontiac again produced the lowest specific gravity. Other varieties that were low in specific gravity were Norland, Monona, and ND7003-2 Russ.

Disease Testing - 1970

In 1970, 636 tubers from 159 parent lines or varieties, 324 tubers from 81 second-year selections, 412 tubers from 103 third-year selections, 624 seedling selections, 942 tubers from 26 advanced selections, and 236 tubers from 59 cooperators' selections were tested for spindle tuber virus. On an individual tuber basis and excluding cooperators' selections, 267 tubers out of 2,938 or about 9% were infected. On a selection basis, 145 selections out of 993 or about 14% were infected. Approximately 9% of the cooperators' tubers were also infected or about 25% of their selections were infected. In addition 9% of our seedlings were infected. About 9% of the 1969 seedlings were infected and about 8.8% of the 2nd year tubers were infected this year. Therefore, the testing technique is at best about 85-90% efficient.

Seven advanced lines were tested for PVX and PSTV resistance, as well as late blight and Verticillium wilt. None showed symptoms in the greenhouse but 5 of the 7 were tolerant to PVX as shown by a local lesion assay on Gomphrena globosa (Table 7). All were susceptible to PSTV.

Scab and silver scurf resistance to all selections was evaluated in Fargo and Grand Forks. Field symptoms of PSTV were also recorded from these plots. A second silver scurf reading of the 1969 harvest selections was taken after storage in July of 1970. In general, the incidence of silver scurf increased and, therefore, most selections were found to be less resistant than the original harvest reading indicated. Norchip appears symptomless to silver scurf at harvest, but develops the disease during storage and is, therefore, quite susceptible. After storage silver scurf readings will be routinely taken henceforth. The scab and silver scurf ratings and PSTV field symptoms of advanced or promising selections are given in Table 8.

N. D. Table 1

1970 CHIP TESTS OF VARIETIES AND SELECTIONS GROWN IN STATE-WIDE
POTATO TRIALS AT PARK RIVER, NORTH DAKOTA DURING 1969

	December 22		January 6		January 13		January 20	
	Color Chart	Yield	Color Chart	Photo V	Yield	Color Chart	Photo V	Yield
ANOKA	9.5	33.8	8.3	25.8	32.5	6.5	30.9	32.5
Cobbler	7.5	34.3	8.0	24.9	33.8	6.5	24.5	33.5
Kennebec	8.0	33.0	6.5	32.5	33.0	5.8	28.4	33.5
Monona	5.0	35.5	4.0	37.0	34.5	3.5	47.4	34.8
Norchip	5.5	35.0	5.8	36.7	33.3	4.2	41.9	33.8
ND5761-5	7.0	34.0	7.5	25.0	33.8	5.0	32.7	34.5
ND5922-12	7.0	35.5	7.3	32.6	33.3	5.0	36.0	34.3
NE6925-13 Russ	8.0	35.5	8.0	24.5	33.3	6.8	31.9	33.0
ND6993-13 Russ	6.0	35.3	6.5	34.9	33.8	4.8	40.1	33.3
ND7003-2 Russ	8.0	36.8	9.0	16.4	33.8	7.3	20.5	31.3
ND7103-4	7.5	35.5	6.0	30.0	34.5	4.5	41.4	35.3
ND7196-18	6.5	34.3	5.5	32.6	34.3	4.5	37.6	33.8

(1) Color chart - standard color chart (1 light, 11 dark).

(2) Yield - percent chip yield.

(3) Photovolt - high numbers are lighter in color.

ND Table 2

1970 CHIP TESTED VARIETIES AND SELECTIONS GROWN IN STATE-WIDE
POTATO TRIALS AT GRAND FORKS, NORTH DAKOTA DURING 1969

	December 22		January 6		January 13		January 20	
	Color Chart	Yield	Color Chart	Photo V	Yield	Color Chart	Photo V	Yield
Anoka	10.5	31.5	9.5	11.0	32.5	8.5	23.8	32.5
						8.8	31.0	30.3
Cobbler	9.5	31.8	7.5	23.6	33.0	7.5	24.5	34.3
						7.3	36.3	34.5
Kennetec	11.0	31.0	6.5	22.9	33.5	7.0	22.9	33.8
						7.2	36.3	35.5
Menona	9.0	32.8	6.3	34.5	33.8	6.0	29.4	32.3
						3.5	41.1	34.5
Norchip	9.0	33.3	6.5	30.4	35.0	5.3	34.6	33.8
						6.5	40.0	34.3
ND5761-5	10.0	34.5	7.8	25.8	34.0	6.8	27.4	34.0
						6.5	30.5	34.5
ND5922-12	10.0	34.3	7.8	25.4	33.3	6.5	31.6	33.0
						7.5	35.5	34.0
ND6925-13 Russ	10.5	33.0	7.8	22.4	33.8	8.0	20.1	33.5
						9.0	35.0	34.8
ND6993-13 Russ	11.0	36.0	8.5	25.1	33.5	6.3	31.4	33.8
						6.9	38.9	35.8
ND7003-2 Russ	10.0	30.5	11.0	14.4	31.5	8.5	19.3	32.0
						9.5	22.3	32.5
ND7103-4	9.5	34.8	7.0	26.3	34.1	4.8	35.9	34.5
						5.9	41.5	35.3
ND7196-18	7.5	34.3	4.5	30.6	34.3	4.3	34.0	33.5
						3.0	40.0	33.3

(1) Color chart - standard color chart (1 light, 11 dark).

(2) Yield - Percent chip yield.

(3) Photovolt - high numbers are lighter in color.

1970 COOKING TESTS OF VARIETIES AND SELECTIONS
GROWN AT GRAND FORKS, NORTH DAKOTA DURING 1969

	Boiling				Baking				
	Slough- <u>1</u> / ing	Meali- <u>2</u> / ness	Texture ³ / Cooking	Color ⁴ / After Cooking	Color ⁵ / 4 has After Cooking	Meali- ness	Texture	Color	Flavor ⁶ / -
ANOKA	7.3	5.5	6.5	6.5	6.3	7.5	8.0	7.3	9.3
Chieftain	7.5	5.5	7.0	8.5	5.5	8.0	8.5	9.0	9.3
Cobbler	4.7	9.3	8.3	7.3	7.0	9.5	8.5	8.0	9.5
Kennebec	8.0	8.3	7.8	7.5	6.7	7.5	8.5	6.5	9.3
Norchief	5.5	7.0	8.0	7.7	5.3	7.3	8.5	8.3	8.7
Norchip	7.7	9.0	9.0	9.0	9.0	9.5	9.3	9.5	10.0
Norgold Russet	7.5	9.0	9.0	9.5	9.7	9.5	9.7	10.0	10.0
Norland	8.5	5.0	8.7	8.0	6.8	7.3	9.0	8.7	9.3
Red Pontiac	9.3	4.8	7.3	6.0	8.3	6.3	7.5	8.3	8.5
Russet Burbank	6.8	9.0	9.0	8.8	9.0	9.5	9.0	9.3	9.3
Monona	7.0	9.3	9.3	8.0	8.3	8.0	8.3	7.7	7.0
Viking	9.3	5.0	5.8	9.3	9.3	6.3	8.5	9.0	9.0
ND4524-4R	9.3	5.5	6.3	8.5	8.3	6.5	8.0	8.7	8.7
ND5761-5	6.0	9.3	8.3	9.3	9.3	9.5	8.7	9.3	9.0
ND5922-12	6.3	8.8	9.3	8.8	7.0	8.7	8.0	8.5	8.7
ND6584-6R	9.0	6.5	6.8	8.8	8.3	7.3	8.0	8.7	8.5
ND6925-13 Russ	7.5	8.8	9.0	9.8	9.8	9.3	9.0	9.7	9.0
ND6948-14R	9.0	4.8	7.5	4.8	6.5	2.5	4.7	7.3	7.5
ND6993-13Russ	7.3	9.3	9.3	8.8	8.8	9.5	9.5	9.0	9.0
ND7003-2 Russ	8.5	4.7	6.8	8.5	9.0	4.7	5.3	7.0	8.3
ND7103-4	7.5	9.3	8.8	9.3	8.8	9.3	9.0	8.7	9.3
ND7196-18	7.5	8.5	8.5	7.5	8.3	8.3	9.0	9.0	9.3
ND7218-22R	6.8	8.3	8.3	8.3	8.5	9.3	9.0	7.5	9.3
ND7240-9Russ	9.5	8.3	8.3	8.0	9.5	9.3	9.3	9.0	9.3
R549-2554	8.5	6.7	8.3	8.0	7.0	8.0	8.7	9.3	8.7
F. Reinhart	4.0	5.0	8.3	8.0	7.3	5.5	7.0	8.3	8.0
1/ (1 Severe sloughing, 10 no sloughing), 2/ (1 not mealy, 10 very dry & mealy), 3/ (1 poor texture, 10 good texture), 4/ (1 dark color, 10 very white color), 5/ (1 dark color, 10 very white color), 6/ (1 poor flavor, 10 good flavor).									

1/ (1 Severe sloughing, 10 no sloughing), 2/ (1 not mealy, 10 very dry & mealy), 3/ (1 poor texture, 10 good texture), 4/ (1 dark color, 10 very white color), 5/ (1 dark color, 10 very white color), 6/ (1 poor flavor, 10 good flavor).

1970 COOKING TESTS OF VARIETIES AND SELECTIONS
GROWN AT PARK RIVER, NORTH DAKOTA DURING 1970.

	Boiling			Baking					
	Slough- ing ^{1/}	Meal- ^{2/} ness	Texture ^{3/}	Color ^{4/} After Cooking	Color ^{5/} 4 has After Cooking	Meal- ness	Texture	Color	Flavor ^{6/}
Aroka	9.0	6.0	7.0	7.0	6.3	8.0	8.0	7.0	8.5
Chieftain	8.7	7.5	7.7	9.0	8.0	8.0	8.0	8.3	8.7
Cobbler	6.7	9.3	9.0	8.0	7.7	8.7	8.7	7.7	9.0
Kennebec	9.0	8.3	8.5	8.5	9.0	8.7	8.7	8.5	9.0
Norchief	8.3	8.3	8.3	9.3	8.7	9.0	9.0	8.7	9.0
Norchip	9.0	9.0	9.0	9.3	8.7	9.3	9.3	9.5	9.3
Norgold Russet	8.0	9.5	9.0	9.7	8.5	9.3	9.3	9.5	9.3
Norland	8.7	6.5	8.5	8.3	7.5	8.7	8.7	9.0	9.3
Red Pontiac	8.7	6.3	8.0	8.7	8.5	7.5	7.5	8.7	8.7
Russet Burbank	8.7	9.5	9.0	8.7	9.0	9.3	9.3	9.3	9.5
Monona	8.7	8.7	9.0	9.3	9.0	7.0	7.0	7.0	8.7
Viking	9.3	8.7	8.3	10.0	9.5	6.5	7.7	9.3	9.3
ND4524-4R	9.3	7.0	7.3	9.3	7.5	6.0	7.3	9.3	8.7
ND5761-5	7.7	9.3	8.7	9.5	7.7	9.5	9.3	9.3	9.5
ND5922-12	7.3	8.7	8.5	7.0	8.5	8.7	8.5	8.7	8.7
ND5584-6R	9.5	6.5	7.0	9.0	7.0	6.7	7.3	7.0	8.5
ND6925-13 Russ	8.3	9.0	9.0	9.5	9.5	9.5	9.3	9.5	9.3
ND6948-14R	9.5	5.0	7.5	6.7	6.7	3.2	6.0	7.3	7.7
NE6993-13 Russ	9.0	9.5	9.0	9.3	9.0	9.5	9.3	9.3	9.7
ND7003-2 Russ	8.3	3.7	6.0	9.0	9.0	5.7	6.7	8.5	8.0
ND7103-4	9.0	9.0	8.7	9.5	8.7	9.5	9.3	9.5	9.5
ND7196-18	8.3	8.7	8.3	8.7	8.5	8.5	9.0	8.5	8.7
ND7218-22R	7.7	7.3	8.0	8.7	8.0	8.3	8.7	7.7	8.3
ND7240-9Russ	9.5	8.0	8.0	9.0	9.0	8.3	8.7	8.7	8.5
R549-2554	9.0	7.2	7.2	8.3	7.7	6.7	8.0	8.5	7.7
F. Reinhardt	7.8	7.3	7.8	8.5	8.3	8.5	8.7	8.3	7.8

^{1/} (1 severe sloughing, 10 no sloughing), ^{2/} (1 not mealy, 10 very dry & mealy), ^{3/} (1 poor texture, 10 good texture), ^{4/} (1 dark color, 10 very white color), ^{5/} (1 dark color, 10 very white color), ^{6/} (1 poor flavor, 10 good flavor).

PER CENT US NO. 1 AND MARKETABLE YIELD OF VARIETIES
AND SELECTIONS GROWN IN STATE-WIDE TRIALS-1970.

	Park River			Grand Forks			Carrington			Williston			Minot		
	cwt/A	% US No. 1		cwt/A	% US No. 1		Dryland cwt/A	% US No. 1	Irrig. cwt/A	% US No. 1	cwt/A	% US No. 1	cwt/A	% US No. 1	Average cwt/A
Viking	206	93		310	93		263	99	467	97	125	95	211	94	264
Chieftain	238	87		268	94		274	92	434	91	141	88	177	84	255
Norland	221	91		209	95		263	96	418	97	135	93	224	93	245
La Rouge	160	80		202	89		262	95	389	95	162	92	247	90	237
Cobbler	187	84		201	89		259	93	369	93	142	88	200	75	226
Norchip	189	72		243	89		189	89	392	92	134	88	200	78	224
Norchief	170	69		264	86		188	85	357	89	115	83	224	80	220
ND6925-13 Russ	149	76		229	86		188	86	374	93	118	77	208	85	211
Norgold Russet	174	82		184	89		214	92	335	91	123	84	212	87	207
Kennebec	160	78		200	90		181	89	357	94	144	85	180	75	204
Ked Pontiac	171	85		162	91		155	92	301	65	171	91	236	88	201
ND7195-18	163	76		164	77		191	87	349	83	117	78	176	83	193
Monona	131	88		136	92		167	94	167	90	97	93	192	83	148
ND6993-13 Russ	108	60		148	73		149	88	297	93	82	59	131	69	153
Russet Burbank	132	77		77	78		132	84	213	65	82	89	132	60	128
ND7903-2 Russ	81	69		76	84		123	92	236	87	39	81	107	85	110
ND5634-2R	160	85		241	91		219	93	351	90					243
Shurchip	141	70		184	89		227	89	413	95					241
ND7103-4	152	82		197	91		220	94	321	94					223
Platte	129	69		243	92		197	89	305	91					219
ND7642-3 Russ	116	70		149	86		173	82	234	96					196
ND5922-12	152	81		181	92		164	92	259	94					189
ND7097-2	111	60		159	78		143	72	333	86					187
ND7233-9 Russ	124	75		158	90		175	94	260	90					184
Average	159	77		191	86		192	90	332	90	120	85	191	82	

N. D. Table 6

SPECIFIC GRAVITY^{1/} OF VARIETIES AND
SELECTIONS GROWN IN STATE-WIDE TRIALS 1970

	<u>Park River</u>	<u>Grand Forks</u>	<u>Carrington</u> <u>Dry-</u> <u>land</u>	<u>Irri-</u> <u>gation</u>	<u>Willi-</u> <u>ston</u>	<u>Minot</u>	<u>Average</u>
ND6993-13 Russ	84	93	89	81	97	94	90
Norchip	88	90	93	80	90	95	89
Cobbler	89	88	86	79	97	91	83
ND7196-18	87	79	88	80	95	94	87
ND6925-13 Russ	85	83	83	81	89	90	86
Norchief	83	85	85	78	91	91	86
Norgold Russet	83	82	87	80	91	87	85
La Rouge	78	76	85	72	87	87	81
Viking	79	79	86	70	86	87	81
Chieftain	82	78	84	73	83	83	81
Kennebec	75	78	79	73	86	90	80
Russet Burbank	76	76	78	79	85	87	80
Monona	77	81	80	70	83	84	79
Norland	75	77	83	70	86	82	79
ND7003-2 Russ	75	71	81	70	74	74	74
Red Pontiac	65	69	73	62	79	81	71
ND7097-2	96	94	93	83			92
ND7103-4	91	90	90	79			88
ND5922-12	81	82	86	77			82
Shurchip	79	84	85	76			81
ND6634-2R	80	77	83	72			78
Platte	74	76	81	72			76
ND7642-3Russ	77	74	77	74			76
ND7233-9Russ	75	76	79	69			75
Average	81	81	84	75	87	87	

^{1/} 1.0 omitted from specific gravity reading.

N. D. Table 7. Disease reactions of promising potato selections for 1970, Fargo.

Selection	Virus Assay		Late Blight	Verticillium Wilt
	PSTV	PVX		
ND5761-5	S	S	S	S
ND5922-12	S	?	S	S
ND6925-13Russ	VS	S	S	S
ND6993-13Russ	S	S	S	S
ND7003-2Russ	S	S	?	S
ND7103-4	S	S	S	S
ND7196-18	S	?	R-0	S

S = Susceptible

VS = Very susceptible

R = Resistant

0 = Race 0, Phytophthora infestans

? = Little or no reaction, possible resistance

N. D. Table 8. Scab, silver scurf, and spindle tuber field symptoms of promising potato selections for 1970.

Selection No.	Scab ¹			Silver Scurf Gen ²		Spindle Tuber ³		
	Area	Type	Gen	Harvest ²	Storage ²	Field	Assay	
							GF	C
ND6634-2R	1	1	4	2	2	-	5/64	0/25
ND7642-3 Russ	1	1	4	5	4	+	1/48	0/24
ND7069-2	T	1	4	5	n.t.	-	n.t.	n.t.
ND7103-4	1	1	4	5	n.t.	-	8/55	4/25
ND7196-18	1	1	4	4	4	-	2/40	1/25
ND7218-22R	T	1	4	3	1	-	6/35	5/25
ND7233-9 Russ	T	1	4	5	5	-	6/45	n.t.
ND7240-9 Russ	0	0	5	5	5	-	n.t.	1/25
ND6925-13 Russ	1	1	4	5	5	+	n.t.	2/4
ND6948-14R	1	1	4	3	3	-	n.t.	2/4
ND6993-13 Russ	T	1	4	5	5	-	n.t.	6/25
ND7003-2 Russ	T	2	4	5	5	-	19/75	0/25
ND5922-12	1	1	5	5	3	-	n.t.	2/4
Norchip	1	2	3	5	3	-	n.t.	0/4
Nordak	T	1	4	5	3	-	n.t.	0/4
Norland	1	1	4	3	3	-	n.t.	0/4
Norgleam	T	1	4	4	n.t.	-	n.t.	0/4
Viking	1	1	4	3	2	-	n.t.	1/4
Snowflake	T	1	4	5	4	-	n.t.	n.t.
Norgold	T	1	4	5	n.t.	-	n.t.	0/4
Cobbler	2	1	3	4	n.t.	-	n.t.	0/2

¹Scab - Area: % of tuber covered with scab.

T = trace; 1,2,3,4,5 = 20,40,60,80,100% covered.

Type: 1 = surface, 2 = large, 3 = raised, 4 = pitted, 5 = deep pit.

Gen: General scab or silver scurf reading:

5 = apparent resistance, no scab; 4 = resistant, light scab;

3 = moderate resistance; 2 = susceptible; 1 = highly susceptible.

²Silver scurf general rating same as for scab general rating only in term of scurf.

Harvest: Rated at time of harvest.

Storage: Rated after storage for 10 months July 1970.

n.t.: No tubers.

³Spindle tuber: Field = tuber symptoms evaluated from scab plot;

Assay = from tomato test;

GF and C = Grand Forks and Casselton assay number tubers positive over number of tubers tested.

OHIO FIELD TRIALS OF POTATO VARIETIES 1970

OHIO

Floyd Lower

The work was done under a cooperative arrangement between the Department of Horticulture of the Ohio Agricultural Research and Development Center and the Ohio State University with the Ohio Potato Growers' Association and local growers. Nine varieties were each replicated three times on each of five farms and Peconic was replicated several times on each of three farms. M.S. 709 has less than three replicates on three farms.

How the Work was Done and Seasonal Conditions

Each plot consisted of two rows in each of which 50 seedpieces were planted. Seed spacing varied from 9 to 11 inches in the row and from 32 to 34 inches between rows. Each grower followed his usual field practices in planting, fertilization, culture and spraying. Planting dates varied from May 4 to May 30. The seed was cut shortly before planting in each case and was dusted with Polyram.

Fertilizer practices varied somewhat but were generally equivalent to about 1,000 to 1,400 pounds of 10-20-20 per acre with additional nitrogen plowed down on three of the five farms. Herbicides and systemic insecticides were used on all of the farms. Three of the five farms were equipped to irrigate but only one used the equipment. Silt loams constituted the soil types.

Moisture conditions were generally good, except that on three of the farms excessive amounts of rain fell in May, June, and July, and in all cases little rain fell in August. The yield of some of the early varieties maturing in August may have been reduced.

Standings were lower than normal because of the wet soil in the spring. Superior and Iopride had the lowest percentage of plants that grew. The percent of stand by variety varied from 70 to 89. Very little virus or wilt disease was present this year.

The marketable grade used throughout would practically meet the requirements of U.S. No. 1. A 50 pound sample from each replicate was graded. Specific gravity and chipping tests will be reported by Dr. Wilbur A. Gould at Ohio State University who did the laboratory work.

Yields and Other Essential Data

Table 1 gives the yields of marketable potatoes in Cwt. per acre by farm and by average of all farms for 1970, listed in order of average yield on each farm. N.Y. 30 and Shurchip led in the average of all farms. Superior normally yields higher than this year.

Table 2 summarizes the average data for all replicates on all farms listed in order of maturity. The percent of perfect stand, weight of 40 tubers (indicating the approximate size), percent grading size B and percent grading culls, major defects, percent marketable and the marketable yields in cwt. per acre are included.

Table 3 lists the average yield of marketable potatoes for each of the eight years and the average for the years grown. It includes varieties used in 1970, and in three or more years of the eight years in which the test plots have been conducted. Of the 24 varieties listed, N.Y. 30 and Shurchip out yielded the other varieties but were in the plots in only the last two years. The varieties averaging above Katahdin are N.Y. 30, Shurchip, B5141-6, Iopride, Kennebec, Penobscot, Peconic, and Norchip. Ona follows closely after Katahdin.

TABLE 1

YIELDS OF MARKETABLE POTATOES, IN CWT., per ACRE, by FARM and by AVERAGE of ALL FARMS - 1970

(Average of Replicates on each Farm)
(Listed in order of average Yield for each farm, using nearest even Cwt.)

FARM NO. 1 (1)	FARM NO. 2 (1)	FARM NO. 3	FARM NO. 4 Total rather than marketable yields	FARM NO. 5	AVERAGE OF ALL FARMS
N.Y. 30 394	N.Y. 30 434	N.Y. 30 584	Shurchip 398	N.Y. 30 352	N.Y. 30 429
Shurchip 326	Shurchip 420	Katahdin 464	Iopride 393	Shurchip 324	Shurchip 382
Norchip 309	Katahdin 395	Iopride 446	N.Y. 30 384	Norchip 305	Norchip 355
Iopride 296	Norchip 378	Shurchip 440	Norchip 382	Peconic 286	Peconic 349
Katahdin 292	M.S. 709 358	Wauseon 432	Alamo 363	Wauseon 245	Katahdin 344
M.S. 709 289	Monona 310	Superior 407	Peconic 358	Alamo 243	Iopride 321
Superior 266	Iopride 306	Peconic 403	Katahdin 330	Katahdin 238	Alamo 308
Alamo 254	Wauseon 305	Norchip 400	M.S. 709 330(2)	Monona 206	Wauseon 297
Monona 246	Alamo 299	Alamo 382	Superior 295	Superior 165	M.S. 709 281(2)
Wauseon 228	Superior 191	Monona 341	Wauseon 276	Iopride 163	Monona 274
		M.S. 709 302	Monona 268	M.S. 709 146	Superior 265
AVERAGE 290	340	418	341	243	328

(1) Peconic not included
(2) One replicate only

TABLE 2

SUMMARY OF AVERAGE DATA FOR ALL REPLICATES AND ALL FARMS - 1970
(Listed in order of maturity. Nearest even whole figures for stand and yield)

VARIETY	Percent of Perfect Stand	Weight of 40 Tubers Lbs.	Percent Size B	Percent Culls	Major Defects	Percent Market- able	Mkt. Yields Cwt./A	Yield Bushels Per. A
<u>Early</u>								
Alamo	87	16.5	5.2	4.6	Gr.Sh.Cr.	90.1	308	513
Superior	71	17.0	3.2	4.0	Sh.Gr.	92.8	265	442
Iopride	70	17.9	3.6	4.0	Gr.Sh.	92.4	321	535
<u>Medium Early</u>								
Monona	80	16.4	3.3	3.7	Gr.Sh.	92.9	274	457
<u>Early Midseason</u>								
N.Y. 30	86	16.5	4.7	2.2	Gr.	93.1	429	715
Peconic	82	14.4(1)	5.7(1)	2.8(1)	Gr.Sc.	92.6(1)	349	582
Shurchip	89	16.5	3.7	5.2	Gr.Sh.	92.2	382	637
<u>Midseason</u>								
Norchip	90	13.5	5.0	5.6	Gr.Sh.	89.3	355	592
Wauseon	82	16.7	3.4	6.8	Gr.Sh.Cr.	89.8	297	495
Katahdin	84	17.1	3.0	6.9	Gr.Sh.	90.1	344	573
<u>Late</u>								
M.S. 709	81	18.7	3.6	11.4	Gr.Sh.Cr.	85.0	281	468
AVERAGE	82	16.5	4.0	5.2		90.9	328	546

(1) Two farms only

MAJOR DEFECTS: Gr.=Greening

Sh.=Misshapen

Cr.=Growth cracks

Sc.=Scab

TABLE 3 AVERAGE YIELDS IN CWT. PER ACRE OF MARKETABLE POTATOES FOR EACH OF EIGHT YEARS AND FOR ALL YEARS TESTED - 1963 - 1970 (Using nearest whole numbers)
(Varieties grown more than two years and those grown in 1970) (Listed in approximate order of maturity)

YEAR	1963	1964	1965	1966	1967	1968	1969	1970	No. Yrs. Tested	Total No. Reps.	Average Cwt./A. for Yrs. Tested	Order of Yield Lots above 300 Cwt.
No. Replicates	9	10	8	8	10	13	14	15				
VARIETY												
Early												
Haig				204	254	233			3	31	230.51	
Cobbler	213	244	251						3	27	236.01	
Alamo						298	286	308	3	43	297.33	
Superior	213	261	289	255	283	269	308	265	8	88	267.87	
Iopride								321	1	15	320.96	4
Med. Early												
Snowflake	246	276	285	195					4	35	250.48	
Norgold Russet		263	259	221					3	26	247.82	
LaChipper	252	316	326	282	325	272	301		7	664	296.22	
Platte					315	273	302		3	37	296.36	
Mouona				229	288	231	284	274	5	57	271.20	
Midseason												
N.Y. 30							397	429	2	30	413.00	1
Peconic						305	297	349	3	43	317.00	7
Arenac		257	332	202					4	35	265.17	
Penobscot	261			222		307	425		3	25	318.17	6
Shurchip							385	382	2	33	383.50	2
Norchip						307	282	355	3	43	314.67	8
Wauseon								297	1	16	297.14	
Katahdin	297	218	405	270	347	284	290	344	8	90	306.87	9
Kennebec	273	253	394	290	386				5	45	319.26	5
B5141-6					326	363	274		3	39	320.98	3
Late												
Jewel							270		1	9	270.40	
M.S. 709								281	1	10	281.47	
Sebago	242	268	374	225	299				5	45	281.65	
Ona	279	247	402	234	350	319			6	58	304.94	10
Average of all lots listed	255	260	332	236	317	288	312	328	8		291.00	

PENNSYLVANIA
Clarence S. Bryner

In 1970 Extension variety demonstrations were conducted in cooperation with county extension agents and potato growers in the following counties and regions: Potter county, north central region; Somerset county, southwestern region; York county, southeastern region; and Schuylkill, Lehigh and Northampton counties, east central region. Eight varieties and four seedlings were evaluated for yield and specific gravity.

Cultural Information and Rainfall

<u>County</u>	<u>Grower</u>	<u>Planting</u>	<u>Harvest</u>	<u>Planting to Harvest</u>	
		<u>Date</u>	<u>Date</u>	<u>Days</u>	<u>Inches Rainfall</u>
Lehigh	W. Hamm	5/19	9/29	133	16.90*
Northampton	R. Henninger	5/11	9/21	133	18.22**
Potter	D. Freeman	4/28	9/30	155	19.00
Schuylkill	E. Dresher	4/29	9/24	148	21.80
Somerset	R. & T. Croner	5/7	10/2	148	22.10
York	R. Waltemyer	5/8	9/11	126	N. A.

*Includes 1.00 inches by irrigation **Includes 2.00 inches by irrigation

All demonstrations were designed as randomized blocks with four replications. Seedpieces of each variety were hand planted in single 25-foot row plots, 9 inches apart within the row. Rows were 34 inches apart. Seedpieces of Norland were planted in 5-foot breaks between plots to identify the plots at harvest time. Total yields were recorded at harvest and tubers were graded for size over 1-7/8 inches.

Specific fertilizer recommendations at each location were made on the basis of soil-test results obtained from the University Soil Testing Laboratory.

The fertilizer applications were:

<u>County</u>	<u>Flow Down</u>	<u>Row</u>
Lehigh	10 tons manure	900 lbs. 16-8-8
Northampton		800 lbs. 16-8-8 (2.4 Mg)
Potter		700 lbs. 16-8-8
Schuylkill	700 lbs. 10-10-10	1300 lbs. 10-10-10 ^{1/}
Somerset	700 lbs. 15-15-15	300 lbs. 10-20-10
	8 tons manure	
York		750 lbs. 16-8-8

^{1/} In excess of recommendations

Specific Gravity and Dry Matter

Specific gravity was determined by the air-and-water method. Single varietal samples composited from four replications were taken at each location for the determinations. Percent dry matter was estimated by use of tables.

Data for the six county trials are shown in the following tables.

Variety	Average % Stand	Total CWT./A.	Yield Over 1-7/8"		Specific Gravity	% Dry Matter
			%	CWT./A.		
<u>Lehigh County</u>						
6HS-9	98	495	97	481	1.076	18.8
Kennebec	98	481	97	466	1.076	18.8
6CX-6	94	434	95	412	1.082	20.1
6RF-1	95	434	89	385	1.071	17.7
Katahdin	98	397	95	378	1.074	18.4
B5141-6	89	411	91	374	1.101	24.2
Russet Rural	98	410	89	366	1.077	19.0
Norchip	98	390	92	357	1.083	20.3
Raritan	96	375	93	350	1.088	21.4
Norchief	94	380	91	345	1.074	18.5
Superior	98	338	97	327	1.073	18.2
Shurchip	98	368	89	326	1.075	18.6
Average	96	410	93	381	1.079	19.5
<u>Northampton County</u>						
Kennebec	98	487	97	472	1.072	18.2
6RF-1	96	483	90	436	1.069	17.3
6HS-9	97	435	96	420	1.078	19.2
B5141-6	100	422	93	394	1.093	22.4
Raritan	95	413	94	390	1.085	20.9
Katahdin	99	382	96	366	1.065	16.5
Shurchip	96	382	95	363	1.069	17.3
Norchief	98	389	91	356	1.073	18.1
Norchip	98	326	95	309	1.081	19.9
6CX-6	95	333	91	305	1.079	19.4
Russet Rural	98	339	89	301	1.078	19.2
Superior	96	301	95	286	1.073	18.2
Average	97	391	94	367	1.076	18.9
<u>Potter County</u>						
Russet Rural	96	416	94	391	1.089	21.6
6HS-9	83	405	96	389	1.084	20.5
Kennebec	100	400	97	388	1.088	21.4
6RF-1	100	399	97	387	1.084	20.5
Raritan	96	351	97	341	1.101	24.2
Norchief	100	376	90	338	1.084	20.5
6CX-6	98	345	94	324	1.091	22.0
Shurchip	97	345	93	321	1.081	19.9
Norchip	100	339	92	312	1.088	21.4
Katahdin	96	316	96	304	1.074	18.4
B5141-6	94	278	89	248	1.106	25.2
Superior	94	254	93	236	1.082	20.2
Average	96	352	94	332	1.088	21.3

Data for the six county trials are shown in the following tables.

Variety	Average % Stand	Total CWT./A.	Yield Over 1-7/8"		Specific Gravity	% Dry Matter
			%	CWT./A.		
<u>Schuylkill County</u>						
6RF-1	96	481	94	452	1.072	18.2
Kennebec	97	469	96	450	1.074	18.4
6HS-9	97	465	95	442	1.070	17.5
Shurchip	99	453	90	408	1.066	16.7
Katahdin	98	412	95	391	1.070	17.5
Russet Rural	94	377	96	362	1.073	18.2
Raritan	92	368	97	357	1.082	20.2
6CX-6	95	377	92	347	1.077	19.0
Norchip	86	365	94	343	1.077	19.0
Norchief	92	369	89	329	1.068	17.0
Superior	98	343	89	305	1.069	17.3
B5141-6	84	328	91	298	1.086	20.9
Average	94	401	93	374	1.074	18.3

Somerset County

6RF-1	98	562	93	523	1.073	18.3
Russet Rural	98	505	95	480	1.088	21.4
Kennebec	99	492	91	448	1.088	21.4
Norchip	99	422	91	384	1.081	19.9
6HS-9	96	386	97	375	1.074	18.4
Raritan	96	392	91	356	1.088	21.4
Katahdin	98	344	95	327	1.068	17.1
6CX-6	95	353	92	325	1.083	20.3
Norchief	98	379	85	322	1.072	18.0
Shurchip	99	351	91	319	1.068	17.1
B5141-6	91	348	90	314	1.097	23.3
Superior	99	350	89	312	1.078	19.2
Average	97	407	92	374	1.080	19.7

York County

Kennebec	89	456	95	433	1.083	20.3
6RF-1	88	450	92	414	1.086	21.2
6HS-9	89	393	91	358	1.082	20.1
Shurchip	98	377	93	351	1.074	18.3
Raritan	89	370	93	344	1.093	22.4
Norchief	73	380	90	342	1.073	18.1
Superior	76	341	96	327	1.078	19.2
Norchip	87	347	92	319	1.092	22.2
6CX-6	97	352	90	317	1.096	23.1
Katahdin	92	333	93	310	1.073	18.2
Russet Rural	94	346	86	298	1.091	22.0
B5141-6	98	319	89	284	1.106	25.2
Average	89	372	92	342	1.086	20.9

Variety Averages (6 Counties combined)

Variety	Average	Total	Yield Over 1-7/8"		Specific Gravity	% Dry Matter
	% Stand	CWT./A.	%	CWT./A.		
Kennebec	97	464	96	443	1.080	19.7
6RF-1	96	468	93	433	1.076	18.8
6HS-9	93	430	95	411	1.077	19.0
Russet Rural	96	399	92	366	1.083	20.3
Raritan	94	378	94	356	1.090	21.8
Shurchip	98	379	92	348	1.072	18.0
Katahdin	97	364	95	346	1.071	17.7
Norchief	93	379	89	339	1.074	18.4
6CX-6	96	366	92	338	1.085	20.7
Norchip	95	365	92	337	1.084	20.5
B5141-6	93	351	91	319	1.098	23.5
Superior	<u>94</u>	<u>321</u>	<u>93</u>	<u>299</u>	<u>1.076</u>	<u>18.8</u>
Average	95	389	93	361	1.081	19.8

PENNSYLVANIA

J. D. Harrington, F. Poust, M. R. Henninger
R. B. Beelman and R. A. Miller

Potato variety trials were conducted at the Agronomy Research Farm, Rock Springs, Centre County (central) and at the Henry G. Shenk Farm, Manheim, Lancaster County (southeast) in 1970.

Soil characteristics at the experimental sites were as follows: deep, heavy, well-drained and slightly acid (pH 6.2). Prior to varietal hand-planting, rows 3 feet apart were furrowed out while simultaneously applying a systemic insecticide and commercial fertilizer. At the Centre and Lancaster County sites, 120-240-120 lb/A and 100-200-100 lb/A N, P_2O_5 and K_2O , respectively, was applied.

Seed for the 26 varieties and seedling numbers was Maine grown, except Shurchip, and obtained from either the United States or Maine Department of Agriculture. Shurchip seed was obtained from the Nebraska Agricultural Experiment Station. Seedpieces (4-cut) were planted 9-inches apart within 25-foot long single-row plots, with a 3-foot break between plots, on April 28 in Centre County and May 7 in Lancaster County. A randomized block design with three replications for each of the three maturity groups (early, medium and late) was employed.

Varieties were mechanically harvested with a "Braco" single-row harvester and baggar attachment on October 7, or 162 days after planting, in Centre County and on October 13, or 159 days after planting, in Lancaster County. During the growing season ample water was available in Centre County, since irrigation water supplemented rainfall, however, extended periods of no rainfall, particularly during August and September, without water being supplemented characterized the experimental site in Lancaster County. Also, average night and day temperature were lower in Centre County compared with Lancaster County.

Origin of the 10 early-, 10 medium-, and 6 late-maturing varieties and seedlings is included with the production indices and tuber quality and chip indices reported in the Table.

Tuber maturity, production and tuber quality indices were obtained as follows:

Maturity - percent vegetative tops naturally dead approximately 19 weeks after planting.

Percent stand - based on the total number of plants emerged four to six weeks after planting.

Total yield, cwt/A - tubers 1-1/2-inch diameter and larger were mechanically harvested, weighed and plot weights were converted to total hundredweight yields per acre.

Percent of total yield 1-7/8" to 4" and 2-1/4" to 4" - harvested tubers from each plot were graded and reported in only two size distribution classes. Size A includes potatoes 1-7/8-inch minimum with 60 percent or more 2-1/4 inches and larger.

Specific gravity - determined from approximately 8-pound tuber samples by the weight in air- and water-method.

Percent solids - values obtained directly from the conversion table reported by G. V. C. Houghland.

Chip yield, lb/100 lb - determined on 8-ounce samples of peeled, washed, 1/16" sliced raw and fried potatoes.

Chip color, Rd - determined with the Gardner Color Difference Meter. Instrument was standardized against color standard C-LY-1047-57. Rd (reflectance) values 20.0 and above may be considered acceptable for marketing.

Tuber quality indices were determined within 4 weeks after harvest at the Department of Horticulture Food Processing Laboratory. Samples were stored at uncontrolled temperature and humidity conditions (field storage).

Data were analyzed with the aid of the IBM 360 computer at the University Computation Center. Varietal differences in production, and quality chip indices for eight variables, e.g., total yield, specific gravity, chip color, within each of the three maturity groups were not always significant statistically. If significant differences among varieties for each variable exist, L.S.D. values should be employed in the interpretation of the experimental data.

Summarized highlights of the results in Centre County (central) were as follows:

The six late-maturing varieties averaged the highest total yields per acre, 416 cwt; whereas, the ten medium- and early-maturing varieties averaged 398 and 346 cwt, respectively. Late-maturing varieties, also, produced tubers highest in specific gravity, 1.084, and chips lightest in color, 19.3 Rd. Tuber specific gravity of medium- and early-maturing varieties was 1.080 and 1.074, whereas, chip color was 15.8 and 16.8 Rd, respectively.

With varieties combined, tuber yields and specific gravity were higher in Centre County compared with Lancaster County, 387 vs. 255 cwt/A, and 1.079 vs. 1.067; but chips darker in color were obtained from tubers grown in Centre County, 17.3 vs. 20.9 Rd.

Highest total yields per acre of early-, medium-, and late-maturing varieties were obtained for B6887-6, 458 cwt; B6741-16, 460 cwt; and Oromonte, 493 cwt. Lowest yields per acre were produced by B6799-1, 254 cwt; Keswick, 341 cwt; and Wauseon, 282 cwt.

All varieties within each maturity group, except B6799-1 and B6750-11, produced 60 percent or more of the total yield 2-1/4" and larger, or met the minimum requirement for Size A potatoes.

Highest percentage of the total yield 2-1/4" and larger for each maturity group were Superior, 87%; B6741-16, 90%; and Abnaki, 85%. Lowest percentage of the total yield 2-1/4" and larger were B6799-1, 56%; B6750-11, 47%; and Raritan, 73%.

High specific gravity and solids content varieties produced high yields of chips. Varieties of low specific gravity tubers produced fewer pounds of chips per 100 pounds of potatoes.

Highest specific gravity tubers for each maturity group were obtained for the varieties as follows: B6820-29, 1.083; Bake King, 1.094; and Raritan, 1.095. Lowest specific gravity varieties were B6887-6, 1.063; Grand Falls, 1.071; and Wauseon, 1.072. However, for the six highest and lowest specific gravity varieties only Wauseon produced chips of acceptable color.

Varieties which produced chips lightest in color were Norchip, Wauseon, Monona and Haig. Varieties which produced the darkest colored chips were B6887-6, B6799-1, B6751-13, and Grand Falls.

Summarized highlights of the results in Lancaster County (southeast) were as follows:

Differences in the average total yields per acre among maturity groups were minor. Early-, medium-, and late-maturing varieties averaged 226 , 230 , and 219 cwt/A, respectively. However, late-maturing varieties produced tubers highest in specific gravity, 1.073, and chips lightest in color, 23.4 Rd. Tuber specific gravity of medium-, and early-maturing varieties was 1.066 and 1.061, whereas, chip color for both maturity groups averaged 19.6 Rd.

Highest total yields per acre of early-, medium-, and late-maturing varieties were obtained for B6820-29, 333 cwt; Grand Falls, 336 cwt; and Abnaki, 289 cwt. Lowest yields per acre were produced by B6741-22 and B6799-1, 143 cwt; Bake King, 93 cwt; and Oromonte, 184 cwt.

Eighteen of the 26 varieties produced 60 percent or more of the total yield 2-1/2" and larger, or met the minimum requirement for Size A potatoes.

Highest percentage of the total yield 2-1/4" and larger within each maturity group were Haig, 71%; Norchip, 77%; and Abnaki, 83%. Lowest percentage of the total yield 2 1/4" and larger were B6799-1, 32%; B6750-11, 37%; and Wauseon, 58%.

High specific gravity and solids content varieties produced high yields of chips. Varieties of low specific gravity tubers produced fewer pounds of chips per 100 pounds of potatoes.

Highest specific gravity tubers for each maturity group were obtained for the varieties as follows: B6820-29, 1.075; Norchip, 1.078; and Oromonte, 1.081. Lowest specific gravity varieties were B6887-6, 1.055; Grand Falls, 1.059; and Wauseon, 1.064. However, regardless of tuber specific gravity, varieties, except B6887-6 and Grand Falls, produced chips of acceptable color.

Fifteen of the 26 varieties produced chips sufficiently light in color (20.0 Rd and higher) to be considered commercially acceptable.

Varieties which produced chips lightest in color for each maturity group were Superior, Norchip and Abnaki. However, differences in chip color among the six late-maturing varieties was not significant.

Varieties which produced the darkest colored chips were B6887-6 and Bake King.

Table 1. Potato variety trials in Pennsylvania, 1970.

VARIETY or SEEDLING	CENTRE COUNTY (central)									
	-----PRODUCTION INDICES-----					-----QUALITY & CHIP INDICES*-----				
	Origin	Stand, %	Total yield, cwt/A	% of yield, 1-7/8" 2-1/4" to 4" to 4"	Spec. grav.	Solids, %	Chip yld., lb/100 lb	Chip color, Rd		
<u>EARLY MATURITY</u>										
B6887-6	USDA	95	458	94	82	1.063	18.0	24.9	11.0	
Superior	Wis.	96	418	96	87	1.081	21.3	29.5	16.4	
Cobbler	Unknown	100	363	93	77	1.078	20.9	27.9	19.6	
Anoka	USDA, Minn.	97	359	93	79	1.074	20.0	28.2	17.8	
B6820-29	USDA	97	354	91	73	1.083	21.6	30.9	15.8	
B6741-11	USDA	94	349	96	85	1.075	20.2	30.9	19.2	
Monona	Pri. (F-L)	98	324	94	79	1.073	19.8	28.0	22.6	
B6741-22	USDA	97	305	90	73	1.071	19.3	27.2	12.6	
Haig	Neb.	97	278	94	75	1.075	20.2	27.5	20.9	
B6799-1	USDA	95	254	87	56	1.064	18.1	25.5	11.7	
L.S.D. (.05)		NS	81	3	7	0.006	1.1	2.8	3.9	
C.V., %		3.7	13.6	1.9	5.3	0.3	3.3	5.8	13.6	
<u>MEDIUM MATURITY</u>										
B6741-16	USDA	88	460	97	90	1.077	20.5	28.6	12.9	
B6750-11	USDA	98	457	79	47	1.082	21.5	27.3	16.2	
B6751-13	USDA	98	443	90	69	1.076	20.3	27.4	11.8	
Shurchip	Neb.	96	406	94	82	1.079	20.9	31.4	18.9	
B6879-11	USDA	91	396	92	77	1.074	20.0	28.5	16.6	
B6741-3	USDA	95	385	94	78	1.081	21.3	27.7	16.7	
Norchip	N.D.	99	377	95	83	1.087	22.4	31.3	25.0	
Grand Falls	CaDa	95	358	92	73	1.071	19.4	26.9	11.8	
Bake King	N.Y.	98	354	93	75	1.094	23.7	33.3	14.5	
Keswick	CaDa	99	341	95	87	1.077	20.6	28.1	14.0	
L.S.D. (.05)		5	NS	3	6	0.004	0.8	2.7	3.7	
C.V., %		3.1	13.1	1.6	4.6	0.2	2.2	5.3	13.6	

Table 1. (Continued)

VARIETY or SEEDLING	Origin	CENTRE COUNTY (central)			-----QUALITY & CHIP INDICES*-----				
		-----PRODUCTION INDICES-----			Spec. grav.	Solids, %	Chip yld., lb/100 lb	Chip color, Rd	
		Stand, %	Total yield, cwt/A	% of yield, 1-7/8" 2-1/4" to 4" to 4"					
<u>LATE MATURITY</u>									
Oromonte	USDA, Colo.	93	493	91	75	1.092	23.4	34.9	17.8
Kennebec	USDA	100	487	95	77	1.084	21.8	30.9	19.8
Katahdin	USDA	100	444	93	79	1.079	21.0	30.4	19.9
Raritan	CaDA, N.J.	99	411	91	73	1.095	23.9	32.6	16.9
Abnaki	USDA, N.Y., Me.	96	378	96	85	1.081	21.4	29.6	17.4
Wauseon	USDA, N.Y.	99	282	94	79	1.072	19.5	26.3	23.9
L.S.D. (.05)		4	71	2	7	0.004	0.8	3.0	4.0
C.V., %		2.4	9.4	1.3	4.7	0.2	1.9	5.3	11.5

* Specific gravity determined 10/29; chipped 11/3, 27 days after harvest

Table 1. (Continued)

LANCASTER COUNTY (southeast)

VARIETY or SEEDLING	Origin	-----PRODUCTION INDICES-----				-----QUALITY & CHIP INDICES**-----			
		Stand, %	Total yield, cwt/A	% of yield, 1-7/8" 2-1 1/4" to 4" to 4"	Spec. grav.	Solids, %	Chip yld., lb/100 lb	Chip color, Rd	
<u>EARLY MATURITY</u>									
B6820-29	USDA	90	333	88	61	1.075	20.1	29.4	20.5
Cobbler	Unknown	99	280	88	67	1.064	18.1	27.0	17.8
Monona	Pri. (F-L)	95	263	90	67	1.056	16.7	24.4	22.7
Anoka	USDA, Minn.	95	253	87	57	1.061	17.6	25.2	20.2
Haig	Neb.	95	247	90	71	1.063	17.9	26.2	21.0
Superior	Wis.	92	223	87	63	1.064	18.0	26.5	22.8
B6741-11	USDA	87	190	86	60	1.056	16.7	26.2	19.2
B6887-6	USDA	91	185	81	46	1.055	16.5	22.3	14.8
B6741-22	USDA	94	143	75	48	1.062	17.7	26.4	19.1
B6799-1	USDA	97	143	79	32	1.058	17.0	27.0	17.7
L.S.D. (.05)		6	89	4	19	0.005	0.9	3.1	NS
C.V., %		4.0	23.0	3.0	19.5	0.3	3.0	6.8	15.9
<u>MEDIUM MATURITY</u>									
Grand Falls	CaDA	96	366	91	76	1.059	17.1	24.0	16.8
Norchip	N.D.	98	345	93	77	1.078	20.8	29.3	24.1
Keswick	CaDA	95	270	93	76	1.069	19.0	25.3	18.8
B6751-13	USDA	91	257	81	51	1.062	17.7	25.3	19.9
B6879-11	USDA	89	252	87	60	1.064	18.1	26.8	20.7
B6741-16	USDA	88	217	90	67	1.062	17.7	26.7	19.0
Shurchip	Neb.	99	199	91	68	1.063	17.9	28.5	19.5
B6750-11	USDA	92	170	68	37	1.074	20.1	28.4	23.2
B6741-3	USDA	94	129	68	47	1.063	17.9	24.2	22.2
Bake King	N.Y.	99	93	81	61	1.070	19.1	28.4	11.5
L.S.D. (.05)		7	107	6	8	0.006	1.1	3.4	5.7
C.V., %		4.5	27.1	4.4	7.8	0.3	3.5	7.5	17.1

Table 1. (Continued)

		<u>LANCASTER COUNTY</u> (southeast)		-----QUALITY & CHIP INDICES**-----				
<u>VARIETY</u> or <u>SEEDLING</u>	<u>Origin</u>	-----PRODUCTION INDICES-----						
		<u>Stand,</u> <u>%</u>	<u>Total</u> <u>yield,</u> <u>cwt/A</u>	<u>% of yield,</u> <u>1-7/8" 2-1/4"</u> <u>to 4" to 4"</u>	<u>Spec.</u> <u>grav.</u>	<u>Solids,</u> <u>%</u>	<u>Chip yld.,</u> <u>lb/100 lb</u>	<u>Chip</u> <u>color</u> <u>Rd</u>
<u>LATE MATURITY</u>								
Abnaki	USDA, N.Y., Me.	92	289	95	83	20.8	28.2	24.8
Wauseon	USDA, N.Y.	94	232	87	58	18.0	28.0	22.9
Kennebec	USDA	93	216	90	68	18.6	25.7	23.7
Raritan	CaDA, N.J.	90	206	88	69	21.1	30.1	21.8
Katahdin	USDA	95	185	91	69	18.4	27.6	22.8
Oromonte	USDA, Colo.	87	184	88	64	21.4	31.4	24.3
L.S.D. (.05)		NS	NS	4	8	0.7	3.0	NS
C.V., %		4.2	37.5	2.7	6.5	1.9	5.8	7.8

** Specific gravity determined 11/2; chipped 11/4, 22 days after harvest

SOUTH CAROLINA
W. R. Sitterly

Purpose: To determine varieties best adapted to coastal South Carolina.

Procedure: Field 0-2 (fine sandy loam) was fertilized with 1100 lbs/A of granular 10-10-10 on February 10. On February 12, seedpieces of test varieties were planted in a randomized block design. The soil moisture was excellent for planting, and soil temperature was 48°F. Before covering the seedpieces, the whole area was sprayed broadcast with 1-1/2 lbs/A of Eptam for nutsedge and grass control.

At last cultivation the area was fertilized with 30 lbs/A of nitrogen. The pesticide program was according to area recommendations. The growing season was very dry and the test had to be irrigated twice during the period of rapid tuber enlargement. Harvest date was June 1, 1970.

Results: As shown in Table 1, no entry produced a significantly higher yield than the LaChipper control. B5141-6 produced the highest yield in this test and Wauseon, B 5701-2 and BR 6246-1 produced significantly lower yields than LaChipper.

South Carolina Table 1. Horticultural characteristics of Irish potatoes in the 1970 variety trial.

Entry	Yield (cwt/A)	Maturity	DM (%)	Tubers
Wauseon	79.5	ME	15.2	Large, oval-elongate, secondary growth
Alamo	100.0	ME	16.4	Medium oval, smooth
B5141-6	126.0	E	22.2	Medium-large, oval-elongate; skin slips
B 5219-1	104.5	M	18.0	Medium oval-elongate, skin cracks, 10% stemend browning, secondary growth
B 5222-2	103.6	ME	16.5	Medium-large, oval
B 5701-2	75.0	M	17.7	Medium-large, oval-elongate
La Chipper	110.1	E	18.5	Medium-large, oval
BR 6246-1	57.5	ML	16.4	Medium oval-elongate, 30% internal browning, 10% stemend browning
LSD ₅	24.6		3.6	

B5141-6 produced a significantly higher DM content than the LaChipper control, while all other varieties and entries were close together.

B5141-6 and LaChipper were the earliest items in this test while BR 6246-1 was deemed too late for this area.

Conclusions: In this test B5141-6 was the best performing Irish potato variety followed very closely by LaChipper. Wauseon, B5701-2, and BR6246-1 were not satisfactory.

Due to a very dry growing season, particularly during the period of rapid tuber enlargement, there was much secondary growth. Accompanying this was a good tuber set per plant, but not much size per tuber.

TENNESSEE

C. A. Mullins, H.D. Swingle, and I.E. McCarty

Fifteen Irish potato varieties were evaluated for processing in 1970. These varieties were grown at the Plateau Experiment Station near Crossville. The potatoes were planted May 1 and harvested August 20. Soil type was Hartsells fine sandy loam. Plot design was randomized complete block with four replicates. Each plot consisted of 1 row 30 feet long. Plants were 1 foot apart in 3-foot rows. Fertilization was 2000 pounds 6-12-12 broadcast per acre.

The growing season was favorable throughout. May was somewhat dry, but June, July, and August had favorable rainfall. Temperatures were not excessive in any of the growth periods.

Tennessee table 1. Yield, tuber weight, tuber length, and tuber width of 12 varieties and 3 selections.

Variety or Seedling	Yield Per Acre		Average ^{1/} Tuber	Average ^{2/} Tuber	Average ^{2/} Tuber
	Total	No. 1	Wt. (Lb.)	Length (In.)	Width (In.)
	Cwt.	Cwt.			
Kennebec	229	206	.38	3.52	2.38
Peconic	211	178	.28	2.85	2.35
Norchip	301	252	.38	3.00	2.40
Superior	229	190	.34	2.76	2.07
Haig	218	176	.31	2.64	2.30
Russet Burbank	288	221	.30	3.26	2.2 ¹ / ₄
Norgold Russet	218	183	.30	3.12	2.11
LaRouge	237	205	.42	3.00	2.30
B5141-6	212	168	.35	3.10	2.51
Oromonte	207	170	.31	2.93	2.27
Wauseon	192	172	.37	2.89	2.38
LaChipper	259	232	.36	2.75	2.34
TL 8134	226	186	.34	2.94	2.22
TL 1859	229	203	.44	3.29	2.47
WC 230-14	247	218	.42	3.53	2.25
L.S.D. .05	N.S.	N.S.	.06	0.40	N.S.
L.S.D. .01	N.S.	N.S.	.08	0.50	N.S.

^{1/} Average of 80 tubers, No. 1 grade

^{2/} Average of 40 tubers, No. 1 grade

Tennessee table 2. Tuber color, tuber appearance, tuber eye depth, specific gravity and chip color of 12 varieties and 3 selections.

Variety or Seedling	Tuber ^{1/} Color	Tuber ^{2/} General Appearance	Tuber ^{3/} Eye Depth	Specific Gravity	Chip ^{4/} Color
Kennebec	1.0	1.0	2.0	1.072	2.3
Peconic	1.5	2.0	1.8	1.077	6.1
Norchip	2.0	2.2	2.0	1.072	4.4
Superior	2.0	3.0	2.0	1.073	6.8
Haig	2.0	2.5	1.8	1.069	5.3
Russet Burbank	3.0	2.0	2.2	1.072	5.6
Norgold Russet	3.2	1.5	2.0	1.067	4.2
LaRouge*	3.8*	2.0	2.5	1.067	7 0
B5141-6	2.2	2.5	1.2	1.081	4.6
Oromonte	2.2	2.0	1.2	1.063	5.3
Wauseon	1.0	1.8	1.5	1.066	6.1
LaChipper	1.2	2.2	2.2	1.065	4.0
TL 8134*	5.0*	1.0	1.2	1.060	5.6
TL 1859*	2.0*	2.8	2.5	1.064	6.4
WC 230-14	2.8	1.0	1.0	1.056	6.7
L.S.D. @ .05	N.S.	0.5	0.6	-	-
L.S.D. @ .01	N.S.	0.7	0.8	-	-

1/ Rating: 1 = light, 5 = dark
2/ Rating: 1 = smooth, 5 = rough
3/ Eye Depth: 1 = shallow, 5 = deep
4/ Chip Color: 1 = poor, 9 = excellent

* Red skinned varieties.

TEXAS

B. A. Perry, R. E. Webb, M. C. Fuqua, W. N. Lipe and S. D. Cotner

Screening and Evaluation of Potato Varieties
and Breeding Lines

Yield Tests. Data from trials conducted at Munday and Lubbock are reported in Texas tables 1 and 2. The potatoes were planted in a randomized design with four replications. A replication consisted of a single row 25 feet in length and 25 seedpieces per row. Di-Syston, 10% granular at 22 lbs/acre, was put down at the time of planting for insect control. Dacthal, W-75 at 14 lbs/acre, was applied immediately following planting for weed control. The planting at Munday was fertilized with a liquid fertilizer at the rate of 200 lbs of N, 40 lbs of P and 200 lbs of K per acre four weeks after planting. Some of the yields are quite low, in comparison to previous trials, which is attributed to poor condition of the seedpieces.

Alkaloid Test. Six varieties were grown in three different areas to contribute to the alkaloid content study being conducted by ARS. The varieties used were Burbank Russet, Cobbler, Katahdin, Kennebec, B5141-6 and Red Pontiac. The yield was especially poor for Burbank Russet at Hearne and Munday. The potatoes were shipped to Dr. Sinden, at Beltsville, immediately after harvest for the quality analyses.

Texas Table 1. Potato Trial at Munday

Pedigree of Variety	Skin Color ^{1/}	U.S. ^{a/} No. 1 ^{2/}	U.S. No. 2	Total Yield ^{b/}	Specific Gravity
B5141-6	W	147.50 a	9.75	157.25	1.056
Norchip	W	139.75 ab	10.25	150.00	1.065
Chieftian	R	137.00 abc	19.25	156.25	1.059
Kennebec	W	121.25 abcd	11.75	133.00	1.061
Norgold	RU	114.50 abcde	16.50	131.00	1.060
BR 5960-5	W	111.50 abcdef	9.00	120.50	1.061
Bt 5404-2	W	106.00 abcdefg	6.50	112.50	1.064
G 570-3	R	104.00 abcdefgh	10.00	114.00	1.060
G 575-4	W	99.25 abcdefghi	23.00	122.25	1.060
B 5415-6	W	99.00 abcdefghi	5.75	104.75	1.062
B 6097-9	W	84.50 defghijk	14.50	99.00	1.064
G 540-4	W	81.50 defghijkl	12.50	94.00	1.066
Cherokee	W	72.50 defghijklm	11.00	83.50	1.061
BC 6530-2	W	62.50 defghijklmn	9.00	71.50	1.059
B 6330-3	W	59.00 ghijklmno	7.25	66.25	1.056
BRC 6463	W	49.50 ijklmnop	12.75	62.25	1.056
BRC 6627-2	W	44.50 klmnopq	8.00	52.50	1.056
Bt 5215-2	W	37.75 klmnopqr	11.75	49.50	1.058
Dt 6063-1R	R	32.75 klmnopqrs	3.50	36.25	1.059
WC 230-14	RU	18.50 nopqrst	10.00	28.50	1.056
Wauseon	W	8.50 nopqrstu	1.50	10.00	1.056

^{1/} R = Red, W = White, RU = Russet

^{a/} Figures followed by the same letter are not significantly different at the 5% level.

^{a,b/} Averages of four replications

Texas Table 2. Potato Trials at Lubbock

Potato	Specific Gravity	U.S. No.1 ^{1a} Bags/Acre	Appearance ^{1/}	Skin Color ^{2/}	Recommendation ^{3/}
B5141-6	1.080	60	3	W Rgh	R
Wauseon	1.060	54	4	W Rgh	D
BC 6530-2	1.055	36.8	2	W Rgh	R
BRC 6463	1.050	30.2	2	W Rgh	R
BRC 6627-2	1.087	46.7	3	W	R
BS 5215-2	1.055	17.6	3	W Rgh	D
BT 5404-2	1.070	51.5	3	Ru	R
DT 6063-1R	1.075	48.8	3	R	R
G 540-14	Extra low	15.7	4	W	D
GS 570-3	1.068	80.1	3	R	R
G 575-4	1.068	66.7	3	W Rgh	R
WC 230-14	1.068	15.6	4	Ru	D
Cherokee	1.078	42.9	3	W	D
Chieftian	1.050	52.1	3	R	R
Kennebec	1.060	58.2	3	W	R
Norchip	1.075	79.6	3	W	R
Norgold	1.055	55.8	3	Ru	R
B 5415-6	1.064	23.4	3	W Rgh	D
B 6097-9	1.073	59.8	3	W	R
B 6330-3	1.050	49.8	3	W Rgh	R
BR 5960-5	1.071	123.9	4	W Rgh	R

1a. Averages of four replications

1. Rate 1-5; 1 = very good, 5 = poor (rough, deep eyes, etc.)

2. R - red, W - white, Rgh= rough, Ru = Russet

3. D - drop, R - repeat, A - advance to yield

TEXAS

R. D. Peel 1/, S. B. Norrell11/, R. L. Nickeson 2/, C. E. Cunningham 2/

Cooperative Testing of Potato Varieties for Use in Soups. Potato variety trials were grown in replicated tests in five locations in Texas in 1970: Mission (south Texas), Pearsall (south central Texas), Hondo (south central Texas), Munday (north central Texas) and Plainview (north west Texas).

Mission (Hidalgo County). Only two (2) of the numbered varieties and none of the commercial varieties outyielded the standard variety Kennebec. Four (4) of the commercial varieties and five (5) of the numbered varieties were higher in specific gravity than the standard. Three (3) of the numbered varieties, BR 5970-4, BR 5946-9 and BR 6315-4, received the highest overall tuber rating.

Pearsall (Frio County). Excellent yields were recorded at this south Texas location but only three (3) of the numbered varieties and none of the commercial varieties outyielded the standard. Only three (3) of the entries were higher in specific gravity than Kennebec. The same three (3) mentioned above were again given the highest tuber rating.

Hondo (Medina County). None of the varieties at this location outyielded the standard Kennebec, although the variety BR 6312-2 was again the high yielder. Thirteen (13) of the entries were higher in specific gravity and eight (8) received a higher overall tuber rating than Kennebec.

Munday (Knox County). Excellent yields were recorded at this north central Texas location but only one (1) variety BR 6316-5 outyielded the standard variety Kennebec. Conversely, only one (1) variety yielded lower than the standard. Eleven (11) varieties recorded higher specific gravity readings than the standard and twelve (12) received a higher tuber rating.

Plainview (Hale County). Five (5) of the numbered varieties and three (3) of the commercial varieties yielded higher than Kennebec and only one (1) was lower yielding. Thirteen (13) varieties were higher in specific gravity and twenty (20) had higher tuber ratings than the standard Kennebec. Kennebec also had the next to the lowest percent No. 1 tubers in this test.

1/ Campbell Institute for Agricultural Research, Paris, Texas

2/ Campbell Institute for Agricultural Research, Riverton, New Jersey

Texas Table 1. Total yield, % No. 1, specific gravity and overall rating of varieties grown at Mission, Texas 1970

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating*
**BR 6312-2	155	96.6	1.053	4.0
BR 5960-5	149	91.6	1.070	4.0
BR 5970-4	124	85.9	1.059	4.5
B 5141-6	124	89.4	1.084	3.5
BR 6265-8	121	94.2	1.059	4.0
BR 5946-9	119	93.1	1.060	4.5
BR 6290-9	118	91.1	1.080	3.5
BR 6306-22	118	92.2	1.063	4.0
Norchip	117	90.6	1.072	3.5
BR 6246-2	115	82.4	1.062	3.5
BR 6316-7	114	90.7	1.063	4.0
Sioux	113	91.0	1.075	3.5
BR 6263-2	108	81.1	1.062	3.5
B 5415-6	108	87.6	1.059	4.0
BR 6315-4	106	95.6	1.059	4.5
BR 6293-12	103	81.3	1.077	3.5
Kennebec	100	87.1	1.064	3.5
BR 6320-1	97	89.3	1.066	3.5
BR 5967-7	95	95.7	1.078	3.5
Shurchip	95	90.4	1.067	4.0
BR 5948-1	94	91.2	1.072	4.0
BR 6290-3	94	79.4	1.058	3.5
BR 6317-21	94	90.1	1.062	4.0
Alamo	93	87.8	1.057	4.0
BR 6316-4	85	94.2	1.061	3.5
Seminole	83	93.8	1.081	4.0
BR 6316-5	48	86.1	1.060	4.0
BR 6261-1	40	61.8	1.049	4.0
LSD .05	25	10.5	0.004	
.01	34	14.0	0.006	
c.v.	17.1	8.5	0.294	

* 1 = Poor to 5 = Excellent

** BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - January 27

Harvest date - May 13

Row spacing - 36 inches

Plant spacing - 12 inches

Plot size - 2 rows, 12 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 800# 10-10-10

Texas Table 2. Total yield, % No. 1, specific gravity and overall rating of varieties grown at Pearsall, Texas 1970

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating*
**BR 6312-2	353	95.4	1.057	3.5
BR 6246-2	296	87.5	1.062	3.0
BR 6316-7	286	85.7	1.071	3.5
Sioux	259	91.4	1.074	3.0
BR 6315-4	257	87.8	1.067	4.0
BR 5970-4	255	85.1	1.064	4.0
BR 6290-3	240	78.2	1.071	3.0
BR 5960-5	233	92.2	1.069	3.5
Alamo	229	86.4	1.064	3.5
B 5415-6	226	88.0	1.074	3.5
BR 6306-22	226	93.8	1.066	3.5
Kennebec	217	87.3	1.071	3.0
Norchip	210	83.2	1.068	3.0
Seminole	210	92.0	1.080	3.5
BR 6293-12	202	68.8	1.072	3.0
BR 6316-4	202	82.4	1.069	3.0
BR 5948-1	200	89.5	1.076	3.5
BR 6316-5	200	88.6	1.071	3.5
BR 6317-21	193	81.3	1.067	3.5
B 5141-6	194	88.9	1.084	3.0
BR 6290-9	184	88.5	1.083	3.0
BR 6265-8	182	85.7	1.064	3.5
Shurchip	178	82.4	1.066	3.5
BR 5946-9	177	94.6	1.065	4.0
BR 6320-1	171	78.2	1.074	3.0
BR 5967-7	168	88.6	1.076	3.0
BR 6263-2	167	83.0	1.063	3.0
BR 6261-1	153	84.4	1.059	3.5
LSD .05	53	8.2	0.005	
.01	71	10.9	0.007	
c.v.	15.0	5.8	0.327	

* 1 = Poor to 5 = Excellent

** BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - January 28
 Harvest date - June 6
 Row Spacing - 36 inches
 Plant spacing - 12 inches
 Plot size - 2 rows, 12 feet long
 Plot design - Randomized block
 Replications - 4
 Fertilizer - 700# 16-20-6

Texas Table 3. Total yield, % No. 1, specific gravity and overall rating of varieties grown at Hondo, Texas 1970

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating*
**BR 6312-2	235	92.3	1.055	3.0
BR 6316-7	212	74.0	1.072	3.0
BR 5960-5	206	90.3	1.072	3.5
Kennebec	205	90.8	1.068	3.5
BR 6246-2	177	81.8	1.063	3.5
BR 6316-4	176	89.7	1.072	3.5
BR 6315-4	176	90.1	1.063	4.0
B 5141-6	175	86.7	1.087	3.5
BR 5970-4	172	86.7	1.064	3.5
Norchip	172	86.2	1.073	3.5
Alamo	167	92.4	1.062	4.0
BR 6317-21	166	77.0	1.065	4.0
B 5415-6	165	90.5	1.071	4.0
BR 5946-9	163	90.5	1.070	3.5
BR 6306-22	161	93.8	1.061	3.5
BR 6263-2	158	83.4	1.059	4.0
BR 5948-1	156	84.4	1.081	3.5
BR 6290-3	155	79.0	1.069	3.0
BR 6290-9	151	85.1	1.084	3.5
BR 6316-5	150	89.3	1.075	4.0
Sioux	149	89.6	1.074	3.5
BR 6293-12	148	75.3	1.078	3.0
BR 6265-8	144	91.3	1.064	4.0
Seminole	144	93.4	1.084	3.5
Shurchip	138	85.4	1.069	3.5
BR 6320-1	133	82.1	1.072	3.0
BR 5967-7	110	86.7	1.079	3.5
BR 6261-1	91	92.9	1.061	4.0
LSD .05	32	5.1	0.003	
.01	42	6.8	0.004	
c.v.	13.7	4.2	0.209	

* 1 = Poor to 5 = Excellent

** BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - February 12

Harvest date - June 10

Row spacing - 36 inches

Plant spacing - 12 inches

Plot size - 2 rows, 12 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 400# 12-24-12 at planting

300# 11-37-0 bound under seed piece

Texas Table 4. Total yield, % No. 1, specific gravity and overall rating of varieties grown at Munday, Texas 1970

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating*
**BR 6316-5	294	86.3	1.078	3.0
Shurchip	290	90.4	1.063	3.0
BR 6320-1	288	84.5	1.071	3.5
B 5415-6	284	93.4	1.064	3.5
BR 5960-5	267	84.1	1.070	3.0
BR 6293-12	263	88.0	1.078	3.5
B 5141-6	257	90.6	1.083	2.5
BR 5970-4	257	76.4	1.065	4.0
BR 6246-2	254	84.4	1.062	3.5
BR 6316-4	250	89.6	1.072	3.0
BR 6290-3	248	87.6	1.068	3.0
Norchip	244	89.8	1.072	2.5
BR 6317-21	240	87.6	1.065	2.5
BR 6290-9	236	89.1	1.081	3.0
Alamo	232	92.2	1.064	3.0
Norgold Russet	231	84.4	1.066	4.0
Sioux	230	87.9	1.076	3.5
Kennebec	221	90.3	1.065	3.0
BR 6312-2	216	80.0	1.052	3.0
BR 6315-4	216	84.8	1.065	3.0
BR 5948-1	209	83.4	1.078	2.5
Seminole	209	83.2	1.080	3.0
BR 5967-7	207	83.5	1.074	3.5
BR 6273-1	200	92.6	1.069	3.0
BR 6316-7	199	84.7	1.069	3.0
BR 6306-22	187	74.5	1.058	3.0
BR 6263-2	181	77.2	1.063	3.5
BR 6265-8	180	76.0	1.064	3.5
BR 6261-1	174	81.2	1.057	4.0
BR 5946-9	132	86.2	1.061	4.0
LSD .05	71	9.4	0.005	
.01	95	12.4	0.007	
c.v.	22.1	7.8	0.351	

* 1 = Poor to 5 = Excellent

** BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company.

Planting date - February 19

Harvest date - July 1

Row spacing - 36 inches

Plant spacing - 12 inches

Plot size - 1 row, 25 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 500# 50-10-50 liquid applied in water

Texas Table 5. Total yield, % No. 1, specific gravity and overall rating of varieties grown at Plainview, Texas 1970

Variety	Total Yield 100# Bags/A	% No. 1	Specific Gravity	Overall Rating*
**BR 6316-5	238	86.5	1.090	4.0
B 5141-6	233	82.9	1.098	4.0
BR 6290-3	229	81.9	1.075	4.0
BR 5960-5	225	90.9	1.081	4.0
Shurchip	223	75.5	1.074	4.0
BR 6315-4	220	81.1	1.072	4.0
BR 6246-2	218	77.7	1.075	3.5
Seminole	217	90.2	1.086	4.0
BR 6316-4	214	79.4	1.077	4.0
BR 5970-4	214	76.3	1.083	4.0
BR 6290-9	213	88.9	1.094	3.5
B 5415-6	211	87.4	1.073	4.0
Norchip	211	81.7	1.081	4.0
Sioux	200	83.2	1.080	4.0
BR 6306-22	195	84.0	1.066	4.0
BR 6293-12	193	74.3	1.092	3.5
BR 6317-21	191	78.5	1.072	4.0
BR 6320-1	189	79.4	1.082	4.0
Alamo	185	78.1	1.067	4.0
BR 5948-1	178	88.3	1.087	3.5
Kennebec	176	72.3	1.073	3.5
BR 5967-7	176	85.5	1.083	4.0
BR 6265-8	175	82.4	1.067	4.5
BR 6316-7	172	71.4	1.076	3.5
BR 6273-1	171	87.3	1.078	3.5
BR 6312-2	160	72.6	1.058	3.0
BR 6261-1	154	90.1	1.063	4.5
BR 6263-2	150	78.2	1.070	4.0
BR 5946-9	134	82.5	1.067	3.5
LSD .05	39	6.8	0.004	
.01	51	9.1	0.005	
c.v.	14.1	6.0	0.263	

* 1 = Poor to 5 = Excellent

** BR selections are the result of cooperative investigations between U.S.D.A. and Campbell Soup Company

Planting date - March 24

Harvest date - July 23

Row spacing - 38 inches

Plant spacing - 12 inches

Plot size - 2 rows, 12 feet long

Plot design - Randomized block

Replications - 4

Fertilizer - 500# 10-20-10

225# Ammonium sulfate

VERMONT

Samuel C. Wiggans, Wilfred R. Kelly, Richard Jensen,
Kenneth Atwood and Hugh Murphy

During 1970, three variety trials were conducted in Vermont by the Plant Pest Control Division of the Vermont Department of Agriculture and the Plant and Soil Science Department of the University of Vermont. These trials were located at Grafton, Wolcott, and South Burlington. There were 16 varieties at Grafton and Wolcott and 19 varieties at South Burlington. There were five replicates in a randomized block at each location. Seedpieces of all varieties were planted by hand. They were 9 inches apart for all varieties in all locations except Norchip which was spaced 12 inches apart and Russet Burbank which was spaced 18 inches apart. These plantings were part of the tri-state cooperative variety trial of the National Potato-Breeding Program.

The plots at Wolcott were planted May 25 and harvested October 2. Fertilizer was applied at the rate of 160-240-240 per acre. The potatoes were grown in a light loamy soil. Moisture was adequate and yields were satisfactory (Vermont Table 1).

The plots at Grafton were planted May 12 and harvested September 22. Fertilizer was applied at the rate of 112-75-75 per acre. The potatoes were grown in a light loamy soil. There was a drought in July and August, and yields were somewhat lower than expected (Vermont Table 2).

The plots in South Burlington were planted May 18 and harvested October 5. Fertilizer was applied at the rate of 100-100-100 per acre. The potatoes were planted in a light sandy soil. There was a drought in July. Irrigation was applied to the potatoes during August. Yields were somewhat lower than average (Vermont Table 3).

Abnaki was the highest yielding variety at Wolcott, second at South Burlington, and sixth at Grafton. It has been a consistently high producer for the past three years. Reliance was high at Grafton and second at Wolcott. F59103, an early variety, was third in yield at Wolcott. Raritan was low in all locations. Raritan seedpieces apparently did not all sprout and produce viable plants.

Table 1. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 16 potato varieties grown at Wolcott, Vermont - 1970

Variety	Yield above 1½ inches cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1/4 to 4 inches	Specific Gravity	Percentage total solids ¹	Chip Color ³
Abnaki	398a*	95.7	87.4	1.072de	18.53	10.0a
Reliance	383ab	96.0	86.1	1.069e	17.89	10.0a
F59103	359abc	94.8	88.0	1.070b	18.10	9.1bc
Kennebec	346abc	93.8	86.6	1.076cd	19.37	8.7cd
BR5960-5	345abc	95.5	77.6	1.082b	20.64	9.7ab
BR5960-13	338abc	98.1	85.4	1.079bc	20.00	8.2de
BR5967-7	337abc	97.5	88.6	1.083b	20.85	9.6ab
Cobbler	330abc	93.8	70.8	1.077cd	19.58	9.1bc
Peconic	326abc	96.2	74.3	1.084b	21.06	8.5cde
Norchip	318bcd	97.0	78.9	1.080bc	20.21	6.8f
Bake King	300cd	97.1	76.1	1.090a	22.33	10.0a
Katahdin	299cd	97.0	84.6	1.072de	18.53	9.7ab
RD311	295cd	96.3	85.8	1.08b	20.85	5.7g
BR5957-7	283cd	98.0	82.0	1.075cd	19.16	8.5cde
Seminole	251de	98.5	88.5	1.084b	21.06	7.8e
Raritan	198e	89.8	81.7	1.083b	20.85	10.0a
L.S.D. (0.05)	53			0.005	1.05	

* Figures followed by the same letters are not significantly different at the 5% level.

Duncan's multiple range test.

1 Calculated from Von Scheele's equations.

2 Seedpieces of Norchip spaced 12 inches apart; all others spaced 9 inches.

3 Chips with lower indices are lighter in color.

Planted - May 25; quick killed - September 9; harvested - October 2, 1970.

Fertilizer: 160-240-240.

Table 2. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 16 potato varieties grown at Grafton, Vermont - 1970.

Variety	Yield above 1½ inches cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1¼ to 4 inches	Specific Gravity	Percentage total solids ¹	Chip Color ³
Reliance	357a*	96.0	82.7	1.060h	15.99	8.9a
BR5960-13	346ab	96.0	78.5	1.074bcd	18.95	5.9def
Bake King	342abc	96.5	75.5	1.076abc	19.37	8.8a
Kennebec	318a-d	96.6	77.8	1.068e	17.68	6.7bcd
Norchip ²	330a-d	96.2	77.5	1.072cde	18.53	5.2fg
Abnaki	306a-d	97.3	84.8	1.069e	17.89	7.2bc
BR5960-5	299a-e	93.5	68.6	1.071de	18.32	6.7bcd
Katahdin	292a-e	96.6	80.3	1.064f	16.84	7.7b
F59103	291a-e	97.2	80.1	1.058h	15.57	7.2bc
Peconic	270b-e	95.4	71.9	1.069e	17.89	5.4ef
Cobbler	260c-f	93.1	65.4	1.069e	17.89	7.3bc
RD311	251def	95.9	75.7	1.070de	18.10	4.5g
BR5967-7	249def	95.2	75.8	1.079a	20.00	7.3bc
BR5957-7	227efg	95.5	74.6	1.063g	16.63	6.8bcd
Raritan	185g	97.1	82.6	1.078ab	19.79	7.6b
Seminole	169g	95.2	66.9	1.074bcd	18.95	6.4cde
L.S.D. (0.05)	16			0.004	9.84	

* Figures followed by the same letters are not significantly different at the 5% level.

1 Duncan's multiple range test.

2 Calculated from Von Scheele's equations.

3 Seedpieces of Norchip spaced 12 inches apart; all others spaced 9 inches.

Chips with lower indices are lighter in color.

Planted - May 12; quick killed - September 7; harvested - September 22, 1970.

Fertilizer: 112-75-75.

Table 3. Yield, percentage of yield between 1-7/8 and 4 inches, specific gravity, and total solids for 19 potato varieties grown at Burlington, Vermont - 1970

Variety	Yield above 1½ inches cwt./A.	Percentage of yield 1-7/8 to 4 inches	Percentage of yield 2-1¼ to 4 inches	Specific Gravity	Percentage total solids ¹	Chip Color
Green Mountain	386a*	95.0	89.5	1.081a	20.43	9.9a
Abnaki	336b	85.3	83.8	1.070efg	18.10	7.1dh
Bake King	330b	98.1	93.0	1.082a	20.64	9.8a
Kennebec	328bc	89.9	88.2	1.074cde	18.95	6.8eh
Oromonte	325bc	94.1	87.9	1.080ab	20.21	6.1gh
Wauseon	317bcd	84.9	80.8	1.068fg	17.68	6.9dh
Peconic	313bcd	96.7	90.2	1.076bcd	19.37	5.9h
Reliance	286cde	81.7	76.8	1.066gh	17.26	9.0ab
B6024-3	279de	98.0	92.8	1.057i	15.38	7.9cde
Norchip ²	278de	96.8	92.1	1.072c-f	18.53	6.8fgh
Alamo	265ef	98.1	91.0	1.063h	16.63	8.0bcd
Katahdin	262ef	90.2	86.9	1.067gh	17.47	7.1dg
F59103	255efg	91.7	89.1	1.056i	15.15	6.9dh
Superior	254efg	86.0	84.2	1.073cde	18.74	6.9dh
Russet Burbank ²	230fgh	57.9% from 4-10 oz.		1.076bcd	19.37	8.6bc
Cobblers	223fgh	96.0	85.5	1.074cde	18.95	7.5def
B5267-2	216gh	97.8	91.9	1.071def	18.32	6.3fgh
Seminole	203h	93.8	89.3	1.077bc	19.58	6.4fgh
Raritan	196h	71.9	69.6	1.085a	21.27	9.0ab
L.S.D. (0.05)	39			0.001	0.21	

* Figures followed by the same letters are not significantly different at the 5% level.

Duncan's multiple range test.

1 Calculated from Von Scheele's equations.

2 Seedpieces of Norchip spaced 12 inches apart; Russet Burbank spaced 18 inches; all others spaced 9 inches apart.

3 Chips with lower indices are lighter in color.

Planted - May 18; quick killed - September 25; harvested - October 5, 1970.

Fertilizer: 100-100-100.

WASHINGTON
Wm. G. Hoyman

The objective of the potato breeding project in Washington is to obtain russet skin varieties having resistance to the common pathogens present in the Pacific Northwest and having desirable qualities for processing. Fifty thousand seedlings are grown annually at the Irrigated Agriculture Research and Extension Center, Prosser, Washington.

Distribution. Two hundred pounds of seedling tubers from 29 families were sent to James A. Twomey, San Luis Valley Branch Station, Center, Colorado. Twenty-six potato growers in the United States and Canada requested Cascade, principally to increase for seed. Cascade was also sent to The Netherlands and Australia.

Early and late harvest trials. These were located in a field that had grown potatoes annually since 1967. The Warden fine sandy loam soil was infested with Verticillium albo-atrum and Streptomyces scabies.

N, P and K were broadcast before plowing at the rate of 300, 50 and 240 pounds per acre, respectively. A starter fertilizer containing 59, 11.5 and 25 pounds per acre of N, P and K, respectively, was banded at planting. The recommended rate of Eptam herbicide was applied before planting. The seed for each trial was cut April 21, treated with 5% Captan dust and planted the following day in a randomized block design having 10 seed pieces of each variety or selection in each of 4 replicates. Seed spacing was 12 inches within and 38 inches between rows. Ten percent granular Aldicarb was banded at planting at the rate of 3 pounds active ingredient per acre and Endosulfan spray was applied 4 times during July and August. The early trial was harvested August 18 and the late trial November 4.

Washington table 1 shows there was a wide range in yield among the 33 cultivars. White Rose grown from X-free seed yielded 444 cwt per acre compared to 309 cwt for that grown from X-infected seed.

Only Norgold Russet, BR6316-5, ND6993-13 and 284-1 were free of common scab and less than 15% of the tubers were scabbed on B6330-3, 285-3, BR6265-8, A63126-2, A6634-19 and ND7003-2. A6334-19 and A6334-20 have been very resistant to S. scabies in Idaho so a different strain of the pathogen apparently inhabits the soil at Prosser.

Hollow heart was of minor importance but Verticillium wilt vine symptoms were present and varied considerably among the 33 cultivars. B6330-3 was the most resistant followed by 3 selections--A6334-19, A6334-20 and BR6316-7--that showed a high degree of resistance.

Time of harvest -- August or November -- did not affect specific gravities of some entries but it had a decided effect on B6330-3 and BR6316-7. Selections B6097-9, BR6316-5, B6044-14, B5400-8 and A63126-2 had high dry matter content at both harvest dates. There did not appear to be any relation between specific gravity and chip color. For example, 1.57-1, Norchip, BR6316-7 and B6024-3 had low specific gravities of 1.079, 1.080, 1.077 and 1.078, respectively, and each had chip color values of 3.

Internal tuber browning (Washington Table 2) was present in various amounts in 21 entries and no cultivars escaped black spot. The technique for producing black spot was rather severe. The tubers were allowed to drop 27 inches from the rear of a moving, single-row potato digger chain onto the top of an abandoned laboratory table top. This was repeated 3 times and the readings taken 4 days later. B6330-3 and Washington selections 284-1, 284-5, 285-3 and 292-1 were very resistant as well as Idaho selection A63126-2. B6330-3 appeared to be one of the most promising selections but it did have a somewhat deep seed end and was susceptible to Meloidogyne hapla.

Selection 168-3. This russet selection was bred in 1961, the parents being A501-13 X Kennebec. It has resistance to the pathogens causing late blight, common scab and Verticillium wilt. It is susceptible to the leafroll virus but net necrosis has never been observed in tubers harvested from vines having season leafroll. A unique feature of this cultivar is its long period of dormancy, and this characteristic is very desirable where natural coastal -- and even eastern Washington -- storage temperatures are not low enough to prevent sprouting of common varieties during the normal winter storage period. Yields of 168-3 in eastern Washington have ranged from 400 to 700 cwt per acre with a high percentage of No. 1 tubers. In western Washington its total yield is comparable to Russet Burbank but superior in respect to the percentage of No. 1 tubers.

Forty-six selections and varieties were included in the root-knot nematode test. The percentage of galled tubers in Washington Table 3 ranged from 0 to 86. The skin of all galless tubers was removed by immersing the tubers in a warm solution of sodium hydroxide. Damage to tubers having 1 to 10 infection loci was rated as very slight, from 11 to 20 as slight and from 20 to 30 as moderate. It is apparent from these data that galling alone is no criterion for evaluating selections for resistance to Meloidogyne hapla.

Washington Table 1. August harvest trial, 1970.

Selection or Variety	Yield Per Acre	Tubers			Verticillium ^{3/}		Chip Color
		1/ Number	2/ Scab	Hollow heart	wilt Vine symptoms	Specific Gravity	
	Cwt.		Pct.	Pct.			
292-3	880	451	40	0	3.25	1.077	7
BR6315-4	849	453	49	1.1	2.75	1.080	8
292-4	739	528	88	0	4.50	1.088	6
B6097-9	688	534	75	0.4	3.75	1.095	4
1.57-1	684	440	18	0	3.75	1.079	3
91.57-H18	667	408	47	0	3.50	1.087	9
Norgold Russet	667	482	0	0.4	5.00	1.083	5
BR6316-5	643	446	0	0.4	2.75	1.098	5
B6330-3	622	281	14	2.5	0.25	1.080	7
ND6993-13	619	371	0	0	3.75	1.085	4
Norchip	615	540	40	0	3.75	1.080	3
Kennebec	605	339	38	0.9	3.00	1.087	7
B6044-14	595	383	74	1.5	3.00	1.098	7
Cascade	585	382	22	0	3.00	1.080	6
B5288-5	567	339	18	0	5.00	1.071	8
284-5	560	484	16	0	3.50	1.091	6
BR6317-25	560	426	56	0	5.00	1.093	3
292-5	550	312	65	0	3.50	1.074	6
ND6925-13	547	507	25	0.4	5.00	1.097	8
292-2	533	472	67	0	2.25	1.080	5
B5400-8	530	508	55	0.2	4.25	1.090	5
285-3	519	430	2	0	3.00	1.083	4
BR6265-8	499	426	14	0	2.75	1.079	6
A63126-2	474	467	1	0	3.25	1.090	8
White Rose-X	444	294	21	0	0.50	1.083	8
BR6316-7	430	439	24	0.4	0.50	1.077	3
B6024-3	426	332	24	0.3	1.00	1.078	3
A6334-19	385	320	14	0	0.50	1.084	4
ND7003-2	385	380	2	0	5.00	1.071	7
284-1	378	328	0	2.2	2.75	1.073	7
292-1	375	376	50	0	3.75	1.088	4
White Rose + X	309	301	17	0	0.50	1.077	8
A6334-20	272	260	21	0	0.50	1.075	8
LSD 5%	150						
LSD 1%	217						

^{1/} Calculated from 40 hills.

^{2/} Includes tubers with slight to severe infection.

^{3/} Taken September 1, 1970.

Washington Table 2. November harvest trial, 1970

Selection	Yield /Acre Cwt.	U.S. No.1 Pct.	Spec- ific Grav- ity	<u>1/</u> Black Spot Index	<u>2/</u> Inter- nal Brown- ing	<u>3/</u> Chip Color	<u>4/</u> Tuber Characteristics
					Pct.		
B6330-3	1048	90	1.091	5	8	9	W,round, deep seed end
292-3	962	80	1.088	45	0	9	W,long
White Rose - X	918	50	1.082	29	16	8	W,long, deep eyes
BR6316-7	873	85	1.102	51	0	9	W,oblong
Kennebec	838	75	1.079	33	12	7	W,oblong
Cascade	791	85	1.084	21	0	7	W,oblong
Norchip	780	70	1.084	18	4	7	W,round, deep seed end
1.57-1	780	90	1.080	39	0	7	W,round, deep seed end
284-1	773	95	1.072	7	0	8	R,oblong-long
White Rose + X	770	65	1.080	20	20	8	W,long, deep eyes
BR6315-4	756	90	1.083	46	0	8	W,round-oblong, cracks
A6334-19	725	85	1.084	20	20	10	R,long
285-3	711	85	1.083	9	4	8	R,long
284-5	677	85	1.078	6	4	7	R,long
91.57-H18	677	90	1.081	45	24	9	W,long, deep eyes
B6097-9	663	90	1.094	59	0	7	W,long
B6024-3	649	50	1.070	10	0	3	R,oblong, cracks
Norgold Russet	646	75	1.075	36	4	4	R, oblong, small
292-4	646	90	1.075	34	4	8	W,long
B6044-14	632	90	1.095	44	4	7	R,round-oblong, cracks
B5400-8	622	60	1.092	39	0	4	W,round, small
BR6316-5	594	95	1.092	52	12	7	W,round-oblong
A6334-20	563	85	1.075	35	8	9	R,long
292-5	563	85	1.073	52	0	8	W,long
BR6265-8	563	80	1.075	53	20	4	W,round-oblong, cracks
ND6925-13	543	65	1.083	38	20	7	R,oblong-long,small,cracks
BR6317-25	515	60	1.096	31	0	7	W,round, small
ND6993-13	512	60	1.083	40	8	4	R,oblong-long, cracks
292-1	508	80	1.082	4	4	8	W,long
B5288-5	505	90	1.072	8	24	7	W,round, deep seed end
292-2	498	75	1.078	36	16	10	W,long
A63126-2	498	75	1.093	6	20	9	R,long, small
ND7003-2	443	40	1.058	17	0	9	R,long, cracks
LSD 5%	174						
LSD 1%	230						

1/ 0 = no black spot, 75 = maximum black spot.

2/ From any cause.

3/ Harvested Nov. 4 and stored at 46°F. until chipped Nov. 9.

4/ W = White, R = Russet

Washington Table 3. Reaction of cultivars to Meloidogyne hapla.

Cultivar	Percent galled tubers	Per cent galless tubers with internal symptoms			
		none	very slight	slight	moderate
A63126-2	0	63	34	3	
A6356-8	3	69	31		
B5288-5	3	72	28		
BR6317-25	4	73	27		
Shoshoni	6	40	29	31	
A6371-3	8	74	26		
A6371-4	9	86	12	2	
284-5	10	85	12	3	
A63184-6	14	66	33		
A6334-17	14	40	44	16	
A6334-20	14	27	73		
A6473-11	14	17	72	11	
285-3	15	58	42		
A63126-8	17	45	55		
A6334-19	19	43	28	19	10
A63126-9	19	53	35	12	
1.57	20	40	41	19	
284-1	20	60	40		
BR6265-8	20	49	50	1	
BR6316-5	22	59	30	11	
BR6316-7	25	43	49	8	
B6024-3	28	52	47		
A6153-12	28	25	70	5	
A59325-2	30	52	39	9	
292-2	31	58	40	2	
A62180-2	31	15	70	15	
Norgold Russet	34	26	64	10	
B6097-9	35	65	35		
292-3	37	25	75		
ND6925-13	41	44	52	4	
A6371-2	43	38	44	18	
B5400-8	45	43	57		
292-5	49	46	49	5	
292-4	51	78	20	2	
White Rose	55	59	41		
BR6315-4	59	69	31		
B6330-3	61	58	40	2	
A6135-4	61	60	40		
A6356-6	64	59	41		
Cascade	69	28	72		
Norchip	70	59	35	6	
Kennebec	76	80	20		
91.57H18	79	42	35	19	4
A589-65	80	55	45		
B6044-14	82	62	38		
292-1	86	33	66		

WASHINGTON

N. Holstad, R. Kunkel, and R. C. Holland

Results of the 1970 Potato Variety Trials

The variety testing program included three trials in 1970: 1) Variety selection trial which included 34 selections, 2) 168-3 trial and 3) WC 203-14 trial.

The land used for these trials was located near Othello, Washington, and was first planted to irrigated crops in 1961. Since then, corn has been grown three years (61, 62, and 65), alfalfa for two years (63 and 64), wheat for two years (67 and 69) and potatoes for two years (66 and 68).

Ten pounds per acre of zinc were broadcast prior to plowing. All other fertilizer was banded, at planting, 2 inches to the side and slightly below the seedpiece. Dacthal was applied at 10 lbs/acre for weed control. Control of mildew, aphids, mites and early blight was on a preventative basis with WSU recommended materials.

The rows were 32 inches wide and the seed was spaced 8.2 inches apart within the rows. Each plot consisted of a single row 28.5 feet long. The Russet Burbank seed was obtained from commercial sources and all other seed was grown at the Washington State Department of Agriculture Nursey at Bellingham, Washington.

Rill irrigation was started on May 29 and was continued until September 15.

Specific gravity determinations were made with a potato hydrometer. Black-spot determinations were made by dropping a 100 gram plug with a hemispherical tip a distance of two feet onto the basal end of the tuber. The tubers were peeled 24 hours later and the amount of discoloration was measured with a photovolt meter.

Variety selection trial. Several of the highest yielding selections in last year's trial (A 503-42, A 6203-4, A 6135-4, W 44-3A and A 6207-3) were not included in this year's trial as all available seed was utilized for seed increase.

Thirty-four selections were planted on April 22 and harvested on October 16. 2,500 pounds of a 16-16-16 fertilizer was banded at planting time.

A randomized complete block design was used with five replications.

The data for total yield, yield over 2-inch, percent number ones and tuber shape and color are in Table 1.

168-3 Experiment. The selection 168-3 is a very attractive long, heavily russetted potato which produces an adequate yield with a high percentage of number one tubers. It has a high solids content and has made excellent French fries with almost no sugar ends. It appears to keep well in storage and has a long rest period.

The treatments consisted of four fertilizer rates: 100, 200, 300 and 400 lbs/acre of N, P_2O_5 and K_2O . The experimental design was a Latin square with 48 plots.

The trial was planted April 24 and harvested October 15. The data for total yield, yield of tubers over 2-inch, percent number ones, specific gravity and blackspot are in Table 2.

WC 203-14. This was one of the most attractive selections in the 1969 trial. It is a long, smooth russet and yielded over 900 cwt/acre in 1969. It is lower in solids and does not fry as well as 168-3 or Russet Burbank. In 1970 it did not yield or grade as well as the 1969 trial, and some of the tubers were severely infected with scab.

This trial was planted April 24 and harvested October 15.

There were four fertilizer treatments of 100, 200, 300 and 400 lbs/acre of N, P_2O_5 and K_2O . The experimental design was a randomized complete block with two replications.

The data for yield, percent number ones, specific gravity, yield over 2 inches and blackspot are presented in Table 3.

Washington Table 1. Variety selection trial, 1970

Selection	Yield per acre			Shape	Color
	Total	Over 2"	No. 1's		
	Cwt.	Cwt.	Pct.		
BR6316-7	738	733	88	Oblong	White
A62180-2	566	545	73	Oblong	Buff
A63126-9	516	512	81	Round-oblong	Russet
WC-203-14	512	494	87	Long	Russet
Russet Burbank	510	476	56	Long	Russet
A6203-4	504	491	76	Oblong	Buff
B5665-7	502	479	85	Long	White
321-65	495	448	82	Round	White
A6305-8	486	453	84	Long	Russet
302.50-5	479	452	81	Long	White
168-3	479	467	87	Long	Russet
A6334-20	476	448	84	Long	Russet
A6334-19	467	440	84	Long	Russet
A63125-8	464	434	79	Round-oblong	Russet
B5141-6	461	447	92	Round	White
A6371-4	453	434	88	Round-oblong	Russet
A63184-6	445	428	81	Long	Russet
A6371-5	441	422	83	Oblong	Russet
Norchip	422	390	81	Round	White
B5613-1	419	402	81	Long	Buff
A6371-3	418	392	79	Long	Russet

Washington Table 1. (Continued)

Selection	Yield per acre			Shape	Color
	Total	Over 2"	No. 1's		
	Cwt.	Cwt.	Pct.		
245-5	410	375	73	Long	Russet
A6334-17	406	365	84	Oblong	Russet
A63126-2	405	359	75	Oblong	Russet
A63126-8	398	374	82	Round-oblong	Russet
245-2	393	354	83	Long	Russet
A6371-1	386	339	61	Oblong	Russet
A59197-5	383	324	78	Long-oblong	Russet
249-1	381	347	81	Long	Russet
Bake King	377	347	83	Long-oblong	Buff
Norchief	373	344	79	Round	Red
ND6327-7Rus.	336	307	84	Oblong	Russet
B5031-18	268	250	66	Round	White
Cascade	156	150	74	Oblong	White

Washington Table 2. 168-3 experiment, 1970

Pounds/acre N, P ₂ O ₅ , K ₂ O	Yield per acre			Specific Gravity ^{1/}	Blackspot ^{2/}
	Total	Over 2"	No. 1's		
	Cwt.	Cwt.	Pct.		
100	378	355	92	1.092	72
200	402	384	91	1.092	74
300	387	373	91	1.090	75
400	386	367	89	1.089	76

^{1/} Specific gravity measurements taken October 22.

^{2/} Bruised on October 27 and 28.

Values: 71 + = slight blackspot
61-70 = moderate blackspot
51-60 = severe blackspot

Washington Table 3. WC-203-14 experiment, 1970

Pounds/acre N, P ₂ O ₅ , K ₂ O	Yield per acre			Specific Gravity ^{1/}	Blackspot ^{2/}
	Total	Over 2"	No. 1's		
	Cwt.	Cwt.	Pct.		
100	464	424	88	1.083	86
200	518	487	90	1.080	80
300	578	556	89	1.077	82
400	530	499	87	1.075	80

^{1/} Specific gravity measurements taken October 28.

^{2/} Bruised October 28.

Values: 71 + = slight blackspot
61-70 = moderate blackspot
51-60 = severe blackspot

WISCONSIN

P. R. Rowe and R. W. Ruhde

Genetics and Cytogenetics of the Tuber-Bearing Solanum Species
(Cooperative ARS, USDA and Wisconsin Station)

Frost tolerance

This year 98 seedling families (1800 total plants) were evaluated for tolerance to frost at Sturgeon Bay by R. W. Ross. These families represented 59 combinations of the wild species blv, can, chm, cmm, mga, mlt, rap, sct, sgr, spg and vrn with Tbr haploids. The first killing frost did not occur until November 7. On that date the temperature reached 29°F for 9 hours and was below 32°F for 14 continuous hours. Even though the seedlings had not been transplanted into the field until July 6, 1/3 to 2/3 of the plants of each family had matured prior to the first frost. Readings that were taken involved the late maturing seedlings in each family. A low percentage of plants with good resistance was noted and 56 clones were selected. Further testing is planned for next year.

Crossability of S. stoloniferum

Work on the crossing behavior of S. stoloniferum involved a study of pollen tube growth following various combinations of sto and 2X and 4X Tbr. The results obtained in 1970 suggest that the poor crossability between sto and 4X Tbr that has been observed previously is due to inhibition of pollen tube growth in the style rather than failure of seed development.

Genetic markers

Diploid inbred lines have been developed to the point that several S₄ and S₅ lines are available for genetic studies. Many inbred lines are very uniform in leaf type, growth habit, tuber shape, tuber skin and flesh color, and flower color. Other characters currently under investigation include pigmented ovary wall, pigmented foliage, tuber shape and leaf types. Crosses between uniform inbred lines which differed in one or more of these traits have been made and progenies are presently growing in the greenhouse. With the aide of thin-layer chromatography the Ac/- and ac/ac genotypes were clearly detected. Several other flavonoid compounds have been separated with TLC, however their identification and mode of inheritance still remains to be investigated. Small samples from many lines were examined cytologically as a preliminary search for variations in the meiotic process that might be genetically controlled.

Development of trisomics

Cytological examination of an interspecific trisomic indicated that the extra chromosome was an iso-chromosome involving the long arm of Chromosome X. Sixty-two interspecific aneuploids were crossed with 8 marker stocks involving the genes F, P, Ac, and Bd. The 3000 pollinations made in the greenhouse at Sturgeon Bay produced 33 successful crosses that involved 53 of the aneuploids and 6 of the marker stocks. Aneuploids detected in the progeny of these crosses with tester clones to produce the progeny that will be studied for distorted segregation ratios.

Efforts to obtain intraspecific aneuploids involved the detection of triploids in the progeny of 4X-2X crosses made in 1969 and the use of these triploids in 3X-2X crosses. In five species (chc, tar, pin, cph, ktz), 73 triploid plants were obtained. In chc, 17% of the progeny from 4X-2X crosses were haploid. Sixty-six triploids representing 5 species (cph, chc, jam, pin, tar) were crossed with 2X clones. Over 4000 seeds were produced by chc, pin, and tar. This will be the base for obtaining intraspecific aneuploids in the future.

Resistance to Pseudomonas solanacearum. (Cooperative project with Dr. L. Sequeira, Department of Plant Pathology, University of Wisconsin).

Results from tests conducted in a growth chamber led to the hypothesis that 3 major genes controlled resistance to the K-60 isolate of P. solanacearum. Progeny from crosses between bacterial wilt-resistant parents and late blight-resistant varieties were tested in Mexico for resistance to late blight in Peru and Colombia for resistance to bacterial wilt. Clones were detected that were resistant to both diseases. These clones will be tested further to substantiate their disease reaction and to determine their adaptation and horticultural characteristics.

WYOMING

K. E. Bohnenblust

The Wyoming potato variety trials were planted at Torrington, Powell and Laramie in 1970. These tests, as usually done, were grown without the addition of fertilizer. At Laramie, the growing season was not adequate for some varieties to perform at capacity. Low yields were generally associated with poor seed quality and in most cases this was associated with low stand counts. Wyred is a good example of this problem. An early freeze the previous fall destroyed all the good Wyred seed available, except the breeders' seed. The result of poor quality seed was a 47% stand at Torrington, which can be compared to the 97 to 100% of several varieties.

The specific gravity readings were generally low for Wyoming and not consistent with previous results. The variety LaRouge was included in tests at Torrington and Laramie, and in both cases it was highest in yield. The analysis of the Torrington data did not show the yield of LaRouge to be significantly different from eight other varieties. LaRouge also ranked highest in weight of U.S. No. 1 tubers. The highest specific gravity was the 1.090 of Norchief. Russet Burbank and Norchip each had a specific gravity of 1.085.

Kennebec was the highest yielding variety at Powell, however, Norchief produced the most No. 1 tubers. The specific gravity readings were very low for Powell, and this was evidenced by the 1.079 of Russet Burbank which was also equalled by Norgold and Norchief. Freezing of samples prevented the specific gravity tests of several varieties.

In the variety trial at Laramie, LaRouge gave the highest yield and the greatest amount of U.S. No. 1 tubers. The specific gravity of Kennebec was 1.095 and Russet Burbank had a reading of 1.094.

Wyoming Table 1. Potato variety yield trial, Torrington, 1970^{1/}

Variety	Yield Per Acre			Rank of US No. 1	Specific Gravity
	Total	US No. 1			
	Cwt	Cwt	Pct		
LaRouge	346	306	88	1	1.079
Norchip	328	268	82	4	1.085
Norland	326	269	83	3	1.072
Kennebec	322	272	84	2	1.083
Norchief	306	251	82	7	1.090
Red LaSoda	306	259	85	6	1.087
Russet Burbank	299	207	69	9	1.085
Norgold	298	262	88	5	1.079
Chieftain	289	243	84	8	1.075
Wyred	217	174	80	10	1.077
Haig	185	139	75	11	1.085
General Mean	293				
LSD	64.5				

^{1/} Date planted -- May 27

Rows spaced 36 inches apart with hills 12 inches apart.

Planted in 1-row plots, 30 ft. long, in 4 randomized blocks.

Date tubers were graded -- November 10

Minimum size of US No. 1 tubers -- 1-7/8 inches.

Date harvested -- October 6.

Date specific gravity was obtained -- November 18.

Previous crop -- Alfalfa

Wyoming Table 2. Potato variety yield trial, Powell, 1970^{1/}

Variety	Yield Per Acre		Rank of US No. 1	Specific Gravity	
	Total	US No. 1			
	Cwt	Cwt	Pct		
Kennebec	263	176	67	2	---
Wyred	223	168	75	5	1.060
Cascade	201	156	77	6	1.075
Norchief	200	182	91	1	1.079
Norgold	196	174	89	3	1.079
Russet Burbank	194	138	71	9	1.079
Norland	193	171	88	4	---
Norchip	191	150	78	7	---
Red LaSoda	175	140	80	8	1.067
Haig	134	113	85	10	1.075
Chieftain	77	69	90	11	---
General Mean	186				
LSD	79.37				

^{1/} Date planted -- May 21

Planted in 1-row plots, 30 ft. long, in 4 randomized blocks.

Rows spaced 36 inches apart, with hills 12 inches apart.

Date harvested -- October 6

Date tubers were graded -- October 6

Minimum size of US No. 1 tubers -- 1-7/8 inches.

Date specific gravity was obtained -- November 6.

Previous crop -- field beans.

Wyoming Table 3. Potato variety yield trial, Laramie, 1970^{1/}

Variety	Yield Per Acre			Rank of US No. 1	Specific Gravity
	Total	US No. 1			
	Cwt	Cwt	Pct		
LaRouge	224	210	94	1	1.087
Red LaSoda	212	199	94	2	1.089
Chieftain	197	181	92	3	---
Norchip	187	168	87	5	1.090
Kennebec	178	163	94	4	1.095
Norland	158	143	91	6	1.075
Norchief	155	138	89	7	---
Norgold	154	135	87	8	1.087
Wyred	137	129	94	9	---
Russet Burbank	115	97	84	10	1.094
Haig	83	73	88	11	1.081
General Mean	164				
LSD	37.9				

^{1/} Date planted -- May 26

Planted in 1-row plots, 30 ft. long, 4 randomized blocks

Rows spaced 36 inches apart with hills 12 inches apart.

Date harvested -- September 22

Date tubers were graded -- October 28.

Minimum size of US No. 1 tubers -- 1-7/8 inches.

Date specific gravity was obtained -- November 6.

Previous crop -- Alfalfa

